

UTILITY PERFORMANCE REPORT FOLLOWING HURRICANE IRENE AND TROPICAL STORM LEE



New York State
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EXECUTIVE SUMMARY

The following report contains the findings of the Department of Public Service's (Department's) investigation regarding the performance of electric, natural gas, and telecommunications providers during Hurricane Irene and Tropical Storm Lee. Our investigation considers whether the utilities were properly prepared for, and responded appropriately to, the effects of the storms. Our review also examines the communications used to inform customers, emergency management personnel, governmental officials, and the media of the service restoration efforts. The report identifies the improvements resulting from the "lessons learned" during the storm events and provides recommendations for corrective actions, where needed. This report does not assess Long Island Power Authority's (LIPA) performance; pursuant to a memorandum of understanding with LIPA, the Department is performing an independent review of LIPA's storm performance. LIPA will be referenced here when necessary to provide a complete representation of the damage that occurred to the electric and gas systems and in reference to the mutual aid process.

Hurricane Irene and Tropical Storm Lee were storms of historic proportion. Irene affected the entire East coast and passed over the eastern half of New York State on Sunday, August 28, 2011. Prior to Irene's arrival, utility companies closely monitored forecasts provided by the National Hurricane Center, the National Weather Service, and, in some instances, their own contracted meteorologists. Based on the storm forecasts, the utilities initiated activities in their emergency plans to prepare for the storms and the needed restoration effort based on expected damage. The electric and telecommunications companies augmented their staffing levels to the extent possible; however, the widespread impact zone of Irene across several states limited the number of crews available for mutual aid.

As Irene passed over New York, several utilities experienced significant infrastructure damage from flash flooding. Continued strong winds on the backside of

Irene uprooted trees where the ground was saturated from the storm's rainfall, resulting in additional service interruptions well into the night. Lee, however, stalled over a more concentrated area of New York and delivered rain onto already saturated ground and swollen rivers, causing severe flooding along the New York and Pennsylvania border. In response to the damage caused by Hurricane Irene and the remnants of Tropical Storm Lee, the Federal Emergency Management Agency (FEMA) declared a state of emergency in 38 of New York State's 62 counties. In total, the electric utilities replaced over 2,100 poles, 2,200 transformers, and over 300 miles of wire. More than 39,000 service drops, 1,800 poles, and 800 copper, coaxial and fiber optic cables were repaired or replaced by telecommunications providers.

Given the timing differences of when Irene passed through the various service territories, the individual electric companies' outage counts peaked at varied times on Sunday, August 28. The companies' peak electric outages totaled 1.1 million customers. The statewide peak, however, was approximately 997,000 customers, which occurred near noon Sunday.¹ Hurricane Irene did not have a major impact on natural gas service, with approximately 1,300 gas customers services interrupted.

Utility service restoration following Irene was challenging. Inaccessibility to facilities was the most significant challenge, with entire sections of roads and bridges being washed out and complicating travel. Restoration efforts were delayed in communities where floodwaters had to recede. Because of the utility companies' efforts to assemble and pre-stage repair crews ahead of the storm, the electric utilities were able to restore approximately half of the customer outages, on a statewide basis, by Tuesday, August 30 and 90% of the customer outages by Friday, September 2.² Restoration of electric service following Irene took over a week for some customers.

¹ The statewide peak represents when the largest number of customers were without electric service at a single point in time. The total number of individual customers affected by the storm is higher than the peak outage count because new interruptions were occurring as previously identified interruptions were being restored.

² 90% of the investor-owned utilities outages were restored by September 1.

New York City was not affected to the extent forecasted, thus allowing Consolidated Edison Company of New York, Inc. (Con Edison) to complete its restoration on Friday, September 2. Niagara Mohawk Power Corporation d/b/a National Grid (National Grid) and Orange and Rockland Utilities (Orange and Rockland) completed their restoration efforts on Saturday, September 3. Thunderstorms on Sunday, September 4 caused additional customer outages and delayed overall restoration for Central Hudson Gas and Electric (Central Hudson) and New York State Electric and Gas (NYSEG) until Monday, September 5.³

Only NYSEG and National Grid were severely affected by Tropical Storm Lee. Flooding and washouts from this storm caused a total of 68,000 electric customers and 11,500 natural gas customers to lose service. NYSEG de-energized six electric substations for safety reasons as a result of the high floodwaters and National Grid had a transmission tower collapse due to excessive erosion. One of the most notable losses of gas service was to the Town of Rotterdam Junction when the single feed into the town along the bridge where New York State Route 103 crosses the Mohawk River was compromised. To restore service to the town (approximately 450 customers), a temporary portable Liquefied Natural Gas facility was brought in. The temporary facility served the town for approximately two months during the construction of a new Mohawk River crossing.

NYSEG used re-entry teams, which consisted of electric and gas personnel, to restore service in areas where individual customers were flooded. By Friday, September 16, the teams restored all customers capable of receiving service. Homes where customer-owned facilities were unsafe remained disconnected. Priority was given to reconnecting these customers after they informed NYSEG that the required

³ The same weather system caused a tornado near the City of Amsterdam. The thunderstorms and tornado resulted in 30,000 electric interruptions to National Grid customers, which were restored by the morning of Tuesday, September 6.

repairs were completed. While most customers have been reconnected, there are still locations where customers have not been able to make repairs.

Staff's general analysis of the electric and gas restoration efforts indicated that all companies were generally efficient and well organized considering the extreme circumstances experienced. Given the widespread nature of Irene and the limited available resources, many electric utilities used resources that had not been used before. Our investigation found this was appropriate and the electric utilities should modify procedures to allow similar supplementing of their workforce in future events. The utilities also need to ensure these individuals are qualified by establishing minimum training requirements. All electric companies need to better define minimum wire guard staffing levels specific to events that are likely to have a high number of wire down incidents and enhance how they interface with town officials to coordinate the removal of hazardous conditions. We identified that NYSEG's overall restoration may have improved if it had reallocated its resources, which were properly distributed based on forecasts, to areas that experienced the most significant damage sooner. The Company also needs to improve communication with county offices when addressing locality-specific issues. As the restoration progresses, Orange and Rockland and NYSEG should provide more refined estimated restoration times at the regional and local levels.⁴

In addition to the storms' impact on the electric system, staff estimates that the combined impact of the storms affected over 900,000 telecommunications services. Wide-scale power outages interrupted service to hundreds of telephone company central office facilities, cable system fiber optic nodes, and wireless company cell sites throughout the State. In some instances, backup power systems were used (e.g., batteries and portable or fixed generators) enabling telecommunications services

⁴ During Irene, customers may have benefitted if NYSEG provided regional estimates on a geographic basis other than its Divisions.

to continue, either temporarily or long-term, where cables were not damaged. Pattersonville Telephone Company and Middleburgh Telephone Company, two small companies operating in rural parts of Schenectady and Schoharie counties, sustained near-complete damage to their central offices and business administration buildings, disrupting service to their entire customer bases. Both companies quickly installed new switching facilities and provided temporary communications capabilities for their customers as they worked to rebuild their networks.

In addition to their own network restoration efforts, Verizon Wireless, AT&T, Sprint Nextel, and Time Warner responded to multiple requests to deploy portable, emergency wireless and wired communications equipment in some of the most devastated areas of the State, providing much needed voice, messaging, and internet service to emergency services personnel and the general public.⁵ The telecommunications providers also indicated that limited access prolonged restorations in some of the hardest hit areas in Ulster, Greene, Schoharie, Schenectady, and Orange counties.

Given the extraordinary damage caused by the storms over a vast area, we found that telecommunications companies generally staffed their recovery efforts to the best of their abilities. Most telecommunications networks returned to normal operations by September 30, 2011 with restorations in some of the more severely impacted areas occurring afterwards. However, Staff believes that Verizon may have prematurely reduced its workforce assigned to storm related repairs. Had the company continued its storm recovery at peak staffing levels longer, Staff believes that the company would have returned to normal operations earlier. Restoration may also have been more efficient if there was better communication and coordination between the wireless and wireline companies. Improvement in this area is needed so that network

⁵ Emergency service requests were received from the State Office of Emergency Management, FEMA, state and local government offices, and municipal officials.

elements critical for emergency communications can be identified and prioritized for repair. Similarly, because telecommunications and electric services are codependent, safer and more expedient service restoration following storms would be optimized if the communication and coordination between telecommunications companies and the electric utilities were improved.

Most electric and telecommunications companies communicated with their customers effectively through their call centers. The electric companies also maintained web sites with outage and restoration information and issued several press releases, a practice that all communications companies, including Verizon, should follow. Some companies expanded their means of communications with customers, and now include the use of alternative communication technologies, such as Facebook and text messaging, to keep consumers and interested parties informed about restoration activities. As these alternatives continue to grow, we encourage the utilities use of them to expand accordingly. We also found that cable and telephone companies have responsive policies regarding the issuance of service credits following disruptions, but found the consumer credit policies of the wireless industry to be inadequately defined and in need of clarification.

Finally, Staff found the reporting of outages and network status to be inconsistent among the various telecommunications carriers with respect to the substance, timeliness, and frequency of information provided. Improved adherence to established outage reporting protocols by all telecommunications companies is necessary, and especially by wireless network providers, whose service is most relied upon by citizens and emergency responders for communication during emergency events. We also found gas utilities need to coordinate their reporting to the Department, rather than relying on localized interactions with our field personnel.

Our report contains specific recommendations where changes to utilities' practices or procedures can improve future performances during emergencies. The

Companies are expected to implement all recommendations no later than 30 days from the issuance of this report. The Companies should report to Staff within 30 days on their progress in implementing the recommendations and then every three months thereafter, until such time as Staff determines the Company's report is no longer necessary. In addition, Staff expects each progress report to include the status of implementing the Company's own recommendations identified in their self-assessments. All requested reports should be directed to the responsible Director and filed under Case 11-M-0481.

OVERVIEW OF STORMS

HURRICANE IRENE

On August 20, 2011, the National Hurricane Center warned of a hurricane forming in the Caribbean. Hurricane Irene strengthened over the warm waters of the Atlantic Ocean to a Category 3 hurricane and made landfall in North Carolina on Saturday, August 27. The storm continued to track up the East coast, with its center passing over New York City on Sunday, August 28. Hurricane Irene caused severe damage from Florida to Canada, resulting in an estimated 6 million power outages over several states. States of emergency were declared in South Carolina, North Carolina, Virginia, the District of Columbia, Maryland, Delaware, New Jersey, Pennsylvania, Connecticut, Massachusetts, Rhode Island, New York, Vermont, New Hampshire and Maine. By the time Irene arrived in New York, it had been downgraded to a tropical storm, yet it maintained enough strength to cause significant flash flooding as a result of the 6" to 14" of rainfall that fell across the region (see Figure 1). Rivers and streams in eastern Upstate New York reached record levels.⁶ Fourteen rivers in New York reached one hundred-year flood levels; flooding in Greene County and adjacent Schoharie County reached five-hundred-year-flood conditions.

⁶ More than fifty U.S. geological survey (USGS) stream-gages measured record peaks, some of which have been in place for over one hundred years.

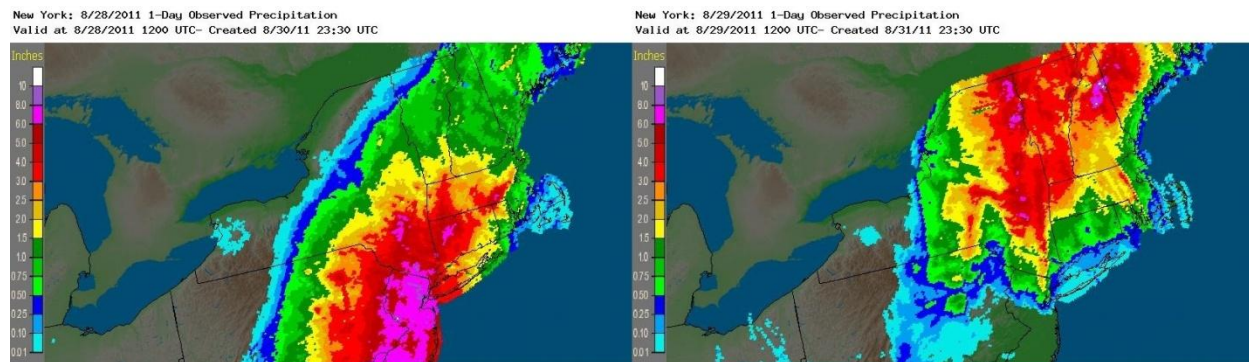


Figure 1: NWS 24-hour rainfall total maps during Hurricane Irene

Heavy rains and gusty winds persisted throughout the morning and afternoon of August 28. By early evening, the worst of the rainfall was over, however, strong wind gusts, exceeding 75 miles per hour in some areas, continued to be experienced throughout the night. Significant flash flooding caused by the rains and high winds, resulted in substantial damage to New York's infrastructure. Additionally, numerous road closures, facility access issues, and limited communication service in hard hit areas, made recovery operations even more challenging.

In the early evening hours on Sunday, September 4, a week after Irene, severe thunderstorms passed over New York. The storms were strong enough to spawn a tornado that traveled about 4 miles along the Mohawk River near the City of Amsterdam. The thunderstorms caused additional damage, re-interrupted customers who were without power after Irene, and, in some instances, extended the overall restoration of customers who were still without power from Irene.

TROPICAL STORM LEE

Tropical Storm Lee developed on Friday, September 2 from a tropical disturbance over the Gulf of Mexico. The storm made landfall in Louisiana on September 4 and moved northward before being downgraded, on Monday, September 5, to a Tropical Depression. From September 5 through September 10, heavy rains soaked portions of central and eastern New York State. Lee combined with a stalled front and delivered total rainfall amounts between 8" and 12" on the southern tier of New York State. Additionally, the storm affected areas where soil was already saturated by Hurricane Irene and river levels were elevated. Record flooding was observed along the Susquehanna and Chenango Rivers. In the Binghamton area, USGS river gauges recorded water levels as high as 17 feet above flood stage, topping the previous record heights achieved in 2006.

Most municipalities near the New York and Pennsylvania boarder saw water overflow levees along the river. Over 20,000 residents were evacuated in Broome County and sections of downtown Binghamton were closed to the public. Flooding was so severe that six electric substations were preemptively de-energized to minimize potential damage. Erosion due to high water in the Mohawk River compromised a gas distribution pipeline that served the town of Rotterdam Junction and a utility tower supporting transmission lines across the river.

DEPARTMENT OF PUBLIC SERVICE

DEPARTMENT RESPONSIBILITY

The Department is responsible for ensuring investor-owned utilities in New York provide electric, natural gas, and telecommunications services in a safe and reliable manner. The Department's specific responsibility for emergency response oversight occurs in three phases: storm preparation, active monitoring of utility impacts and system restoration, and post-storm analysis. To ensure that the electric utility companies are fully prepared, Part 105 of Title 16 in the New York Codes, Rules, and Regulations (NYCRR) requires each electric utility to have comprehensive Emergency Plans, detailing and documenting the company's response plans for emergencies. The Emergency Plans define roles, responsibilities, and required training to reduce confusion and promote a common understanding of the restoration process.⁷ Each electric utility is expected to conduct restoration efforts in compliance with its Emergency Plan, and to update its plan after a major event to capture all lessons learned. For natural gas companies, Emergency Plans are required by Part 255 of 16NYCRR. The plans are reviewed annually by Department Staff.

Facilities-based telecommunications companies are required to provide their Emergency Plans when they apply for a Certificate of Public Convenience and Necessity. Thereafter, they attest annually that they have a plan in place. Federal regulations require cable and wireless telephone providers to have Emergency Plans; there are no state regulations for these providers. As part of our investigation, Staff reviewed Verizon's Continuity of Operations Plan; verified that the major wireless and cable companies have similar type emergency plans; and reviewed summary Emergency Plan information provided by some cable and wireless companies.

⁷ Part 105 also requires annual drills to ensure that all employees are aware of their role and function during an emergency.

The Department's role during a storm emergency is to oversee the utilities' efforts, and ensure that they are properly fulfilling their obligations. We communicate with the utilities prior to predicted events and throughout the restoration process and provide reports based on information learned. Staff participates in weather briefings, monitors the utilities' outreach efforts, and assists customers directly through the Department's call center. Staff also visits affected areas and communicates with local officials and county emergency response managers as needed. Our main objective is to promote a good, high-quality information flow between interested parties and the utilities during a storm. Following a significant storm, Staff will perform a detailed review to determine whether the utilities were properly prepared for, and responded appropriately to, the effects of the storm. These actions are discussed in further detail below.

MONITORING UTILITY PERFORMANCE DURING EVENTS

To understand the effects of storms, or other emergencies, on the provision of utility services, Department Staff actively communicates with utilities prior to predicted storms and we receive periodic reports during and following these events.⁸ These communications focus on the efforts being taken to prepare for a storm, the amount of infrastructure damage, customer impacts, response efforts, and restoration of service projections. In the days prior to the arrival of Hurricane Irene, Staff contacted electric, gas, and telecommunications providers projected to be impacted by the impending storm. In total, six of the seven major electric companies and over 30 incumbent telephone companies, competitive telephone companies, cable companies,

⁸ In addition to monitoring the investor-owned utilities we regulate, Staff interacts with LIPA and several communication companies during emergencies such that a comprehensive, statewide assessment of utility service availability can be performed.

and wireless carriers were considered to be in the path of the storm.⁹ Communication continued with the utilities on a regular basis, from the early morning hours to late into the night, throughout the service restoration process.

The information we learned from these interactions was provided in status reports to a distribution list that included Commissioners and the Department's management, New York State governmental executives, and the New York State Office of Emergency Management. For Hurricane Irene, we issued our first reports on August 26 and 27. They identified the actions the utilities were taking to prepare for the hurricane, including how the utilities were supplementing their staffing levels. These activities are discussed in detail later in the report.

As the storm arrived, our reports focused on providing information regarding the storm's effect on electric, gas, and telecommunications services. With the rapid changes in the number of customers who had lost electric service, we issued our formal reports on a two-hour basis on Sunday, August 28 as Hurricane Irene passed. A total of seven reports were issued on the first day of the storm. As conditions began to stabilize, our reporting reverted to our typical schedule of four formal updates per day. Numerous informal interim reports of electric outages were also provided to the State Office of Emergency Management upon request, often as much as once an hour at the height of the storm. Formal reports continued to be provided until September 16, when the utility systems were generally considered restored. Thereafter individual electric and gas interruptions remained that required specific customer actions before the utility could safely reconnect service. Also, the telecommunications interruptions were, for the most part, limited to small pockets of scattered outages along with individual service problems.

⁹ Rochester Gas and Electric was the only electric company not expected to be affected by the storm because its service territory is in western New York only.

In addition to our reporting efforts, Staff made field visits to various affected locations to assess damage and monitor utility restoration efforts. The Department's electric group visited all of the affected electric utilities following the storm. In total, over 20 field visits were performed between August 29 and September 15. As a part of these visits, Department employees monitored utility response and restoration actions, independently surveyed the extent of damage, and documented its findings associated with these activities. The Department's gas safety group also had a field presence, particularly following Tropical Storm Lee. It responded to conditions where facilities were exposed, witnessed leak surveys, and monitored the inspection and relight process for gas customers who were shut off during the storms. The gas safety group's field personnel also monitored the re-gassing efforts for Owego, Conklin, and Hopewell Junction. The Department's telecommunications group visited several telephone companies in the Capital District and Hudson Valley regions to assess the damage caused by the storms and review company restoration efforts. Staff also visited T-Mobile's Network Operation Center, which was responsible for the Company's emergency response in New York and much of the East Coast.

Our field visits occurred across the state and they focused on the areas where utility infrastructure was compromised. Road closures, and other inaccessibility issues, limited our ability to survey all of the severely damaged areas. Overall, Staff's field presence is a valuable part of a comprehensive evaluation of a utility's performance during a storm and helps us identify any inefficient operations. Several of the recommendations for corrective actions included in this review are based on observations made from these field visits.

In addition, the Department's Office of Consumer Policy staff monitored 66 municipal conference calls held between the morning of Friday, August 26 and the night of Sunday, September 4. During the conference calls, Staff monitored the information the utilities provided to municipal officials and listened to the questions and

concerns expressed by the participants. In addition to the routine post-storm electric municipal calls, a gas municipal call and three pre-storm municipal calls were conducted. At the conclusion of each call, Staff provided a brief summary of the group discussion.

DEPARTMENT CALL CENTER ACTIVITIES

During emergencies, the Department's Call Center, operated by the Office of Consumer Service (OCS), disseminates available information on the estimated times of restoration, evacuation centers/maps, shelter locations, dry ice and bottled water availability, helpful websites, and hazard alerts. The Call Center staff assists to calm customers and refer vulnerable customers directly to utility company personnel for appropriate assistance. The Call Center also records complaints from customers. The complaints about the utilities are discussed later in the report.

On August 26, OCS established its channels of communication with the customer service organizations at each of the affected utility companies, including LIPA. All the affected regulated electric and gas companies were contacted to ensure that bill collections were suspended during the event and that the utilities worked with customers on a case-by-case basis by providing assistance with bill payments, extensions, agreements, and information needed for insurance or federal aid. Suspending service terminations enabled the utility field collection staff to be reassigned to assist in storm restoration activities.

OCS Staff received routine updates throughout each day of the event from all major electric utilities and from Department Staff to provide consumers the most up-to-date information available. During Irene, our working hours were extended to cover Saturday and Sunday, August 27 and 28, and Saturday, September 3. Due to the increased volume of calls, we added personnel to the Call Center Hotline during the event. As the storm progressed, OCS reviewed the extent of electric outages related to

the storm, focusing on the health and safety of interrupted customers and the impact of a prolonged loss of service.

The Department's Call Center received 467 phone calls from customers who mostly expressed frustration or dissatisfaction with the duration of their outage or the information they received from their utility company. As shown in Table 1 below, 147 calls, or about one-third of the complaints, were received from LIPA customers. Many of the callers expressed frustration with the lack of restoration information available. Staff obtained the necessary information from the customer and connected them with the Executive Customer Service Office at LIPA. In addition to phone calls, OCS received 65 written complaints following the storm event for a total of 532 customer contacts. In 293 instances, OCS staff provided customers with the information they requested; the remaining 268 instances we received resulted in consumer complaints about utility performance.

Table 1: Customer Phone Calls by Utility

Utility	Phone Calls Received	Percent of Total Calls
LIPA	147	31%
Con Edison	79	17%
NYSEG	75	16%
Verizon	45	10%
National Grid (Upstate)	42	9%
Orange and Rockland	24	5%
Central Hudson	21	4%
Cablevision	16	3%
Time Warner	7	1%
National Grid (Metro and Long Island)	2	0.4%
Sum of other Communications Providers	9	2%
Total Calls Received	467	100%

STAFFING EMERGENCY OPERATIONS CENTERS

The New York State Office of Emergency Management is responsible for coordinating the activities of all State agencies to protect New York's communities, the

State's economic well-being, and the environment from natural and man-made disasters and emergencies. Its Emergency Operations Center (EOC) is used to collect and evaluate information, establish priorities, and manage resources during an event. The Department has a desk at the emergency operations center at which we provide information regarding service interruptions, damage to utility facilities, and restoration progress. Our desk representative, serving as an interface between the emergency staff present at the EOC and Department staff, relays verbal requests and requests submitted through the State EOC's Ticket Report Manager. Given the weather predictions and the predicted impacts, the State EOC activated all desks at 8:00 a.m. on Friday, August 26. Our desk was staffed on a 24-hour basis for sixteen consecutive days, until we were released at 8:30 p.m. on September 11. Satellite emergency operation centers were also opened at the Schoharie Fairgrounds in Cobleskill, NY and the Belleayre ski resort in Highmount, NY. In general, these centers were staffed from 8:00 a.m. to 8:00 p.m. from September 1 through September 9. In total, 44 Department employees staffed the desk positions, with many taking multiple shifts.

In addition to desk staffing, the Department participated in daily Multi-Agency Conference Calls, sponsored by the State Office of Emergency Management, and participated in several conference calls hosted by the Critical Facilities and Infrastructure Branch of the EOC. Staff also helped facilitate the restoration of telecommunications service in areas devastated by the storm so that first responders would be able to communicate more easily. Major efforts were also made to help deploy portable cellular service and repair priority cables needed for wireless cell sites in Broome, Delaware, and Greene counties.

CONSUMER COMPLAINTS AND PUBLIC COMMENTS

The Department appreciates receiving comments from the public to provide additional insights, points of view, and knowledge of events that may be a cause

of customer frustration. In all, 239 consumer complaints were filed with the utility companies by OCS staff. In addition to the customer complaints, 25 comments were received from the public and two from public officials.¹⁰ Eleven customer comments presented concerns about the restoration of electric service by Central Hudson, Con Edison, and LIPA. Eight other comments discussed service problems with Verizon. Several of the filed comments were in support of Central Hudson and two positive comments were made regarding Time Warner Cable service and wireless service (one each). The customer complaints and comments discussed the following concerns:

- extended outage durations and difficulties in receiving accurate restoration information, including restoration commitments that were not met;
- concern that the utility forgot some homes when not everyone on the street was restored at the same time;
- difficulties experienced by customers expecting prioritized service restoration, including customers with recently obtained medical equipment not yet reported to the utility;
- trouble obtaining dry ice and bottled water distribution information;
- downed wires reported to the utility that were left unsecured;
- difficulty in reaching a live representative in the company call center;
- food spoilage and other damage to property resulting from the lack of service; and
- being billed for the time service was interrupted.

POST-EVENT INVESTIGATION

For large storms, or events involving extended restoration durations, the Department reviews the utility performance to determine whether the actions taken by a company were appropriate, and to determine if there were restoration activities that may benefit other companies. Staff's assessment of the utilities' performance in responding to Irene and Lee is based on multiple factors, including: a thorough analysis

¹⁰ The comments were submitted either by mail or by filling in a form on the Department's web site. Several of the comments we received appear to have been prompted by a news story related to the hurricane.

of the information filed by the utilities; our own field observations and interactions during the event; responses provided to Staff interviews and inquiries; our review of discussions with public officials and emergency management personnel; evaluation of complaint data filed with the Department's Office of Consumer Services; and, our review of comments filed by the general public. Our review highlights successes, determines the areas that require improvement, and recommends corrective actions as needed. In addition to reviewing the information prepared by the utilities regarding their performances during a storm (discussed in further detail below), Staff meets with the companies and submits formal information requests to establish a complete record.

To ensure that their Emergency Plans are effective, 16 NYCRR Part 105.4(c) requires electric utilities to submit a report to the Commission assessing all aspects of its service restoration efforts for all events when outages last more than three days.¹¹ All major electric utilities, except Rochester Gas and Electric, were required to report on their storm preparation and service restoration efforts associated with Hurricane Irene and Tropical Storm Lee. The reports were due 60 days following the completion of restoration.¹² However, due to the October 29, 2011 nor'easter that diverted the utility resources being used to complete the report, one week extensions were granted to all utilities whose reports had been due on November 7, 2011.¹³ At our request, National Grid covered both electric and gas operations in its report because of the circumstances experienced in Amsterdam and Rotterdam Junction during the storms. To obtain information from telecommunications providers, who are not required to provide post-storm reports, Staff sent letters to 30 companies, including cable and wireless providers,

¹¹ With regard to filing requirements, the duration of the restoration period is measured from when customers go out of service.

¹² Reports for Central Hudson, Con Edison, National Grid, and Orange and Rockland were due on November 7, 2011. Because of the outages associated with Lee, NYSEG's report was due on November 18, 2011.

¹³ Con Edison and Orange and Rockland filed petitions with the Department requesting extensions based on the resource conflict. Although only two utilities filed, it was determined that extension should apply to all utilities because each one was, in some manner, impacted by the October snowstorm.

requesting that they respond to prepared questions to detail their storm preparation and response activities.

In general, the reports filed by the electric utilities presented factual information on the storms, customer outages, and the staffing levels used in the restoration effort. Much of the information they contained concerning preparation and restoration activities was generic and not specific to Irene and Lee. Also, while the reports referenced the use of established emergency plans, they failed, for the most part, to define the specific actions taken in these instances to comply with the emergency plan requirements. Overall, the reports lacked discussion of key decision making efforts and contained only limited discussion of “lessons learned.” In several instances, the first time an issue was raised in the report was within a recommendation for corrective action. Given the magnitude of this storm event, the lack of storm-specific information and the details about specific actions taken gives a false impression that average efforts were involved. We believe the reports fail to depict accurately the hard work and efforts taken by the electric utilities. For these reasons, the reports did not meet our expectations.

The purpose of the utility’s self-assessment report following a significant emergency is for the company to demonstrate that it took appropriate actions prior to and in response to an emergency. To that end, the report should identify the impact of specific events on its facilities and equipment; discuss the particular efforts taken to restore service in a safe and efficient manner; and articulate the communications with customers, the media, local municipalities and other governmental officials, human service agencies, and emergency management offices. Utilities need to discuss in detail how and when the Emergency Plans were followed; the specific result of such actions; and any corrective actions that are needed. Merely stating that the plans were followed is not sufficient. The reports should identify both positive and negative aspects of the response and any data presented should be properly supported by a narrative

discussion. If sufficient details are not being captured as part of existing operations to produce a thorough report, emergency procedures should be modified immediately. Finally, the report needs to state future activities that should be taken to avoid the problem or repeat the success. With regard to recommendations for corrective actions, the utilities should identify specific actions to be taken, including expected milestones for development and implementation.

Recommendation:	Guidelines for writing self-assessment reports should be developed through a collaborative process including Staff and the electric utilities to ensure future reports contain all appropriate information and provide a comprehensive discussion of key decisions and actions taken. The resulting guidelines should apply to all electric utilities.
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COMMUNICATIONS

The utilities' ability to deliver timely and accurate information to customers and key stakeholders following a major outage is vital. In today's information age, the public is less tolerant of incomplete or inadequate information. Customers increasingly expect their utility to know when their service is lost and be able to quickly provide an accurate estimate of when service will be restored. Major storms require a more disciplined approach to outage communication as the restoration process is more dynamic. Information is provided through several sources including utility call centers, media broadcasts, web sites, and social media platforms. The following presents our review of how well the electric and telecommunications companies conveyed information following Hurricane Irene and Tropical Storm Lee.

UTILITY CALL CENTERS

It is important for utilities to establish effective communications with their customers who contact the call centers. Irene was forecast well in advance and as a result, the staffing needed to handle the extra call volume was in place prior to the start of the storm. Coverage was available around the clock at each utility call center thus enabling customers to communicate with the utilities throughout the event.

Most utility call centers are equipped with interactive voice response (IVR) systems to automate the handling of many incoming customer calls. Many of these systems have advanced outage reporting features. For example, if the customer's calling number is on record, NYSEG's IVR system will proactively identify the customer calling in and provide information about their specific circumstances. If the customer is calling about an outage that was not previously identified, the system will prompt the customer to report additional information either through the IVR or to a customer service representative.

In general, call center staffing was adequate and average wait times for customers were reasonable throughout the storm event. During the height of the storm, however, Orange and Rockland's call volume was greater than 10,000 calls per hour, which exceeded the capacity of its call center. As a result, some customers were unable to reach the Company to obtain information or to report an outage. To better meet increased call center demand, Orange and Rockland should obtain technology enhancements that include increased capacity, call tracking, and better utilization of IVR technology, interfaced with its outage management system.

<p>Recommendation: Orange and Rockland should provide to Staff a report outlining the steps it will take to improve overall call center technology and performance during storms.</p>

In addition to its routine interactions, the telecommunications providers use call centers to issue credits for out-of-service conditions. The terms and conditions warranting customer credits vary among telecommunications industry segments. The Department has established service credit rules for telephone service and cable video outages. Wireless and other phone service providers have indicated that, as a general matter, customers may request bill credits for service affecting conditions. Depending on the individual company's policy concerning service-affecting conditions and durations, customer credits may either be automatically issued by the service provider, or the customer may need to request them on an individual basis. We found that cable and telephone companies have well documented policies regarding the issuance of service credits following disruptions, but found the consumer credit policies of the wireless industry to be inadequately defined and in need of clarification.

Following Irene and Lee, wireline and cable companies issued more than 281,000 credits to customers, totaling over \$1,750,000. Sprint Nextel and T-Mobile both issued a small number of customer credits totaling several thousand dollars. Verizon Wireless and AT&T did not provide Staff with the requested customer credit information.

Recommendation:	Wireless and other phone service providers should clearly define their customer credit policies for widespread outage events and maintain records of the credits issued to New York customers in response to such events.
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CUSTOMER COMMUNICATIONS

Utilities provided public information for customers on their websites and through press releases. In most cases, this information was updated regularly throughout the day. Most electric utilities engaged themselves in a proactive media effort, issuing multiple press releases daily. The press releases typically contained emergency contact numbers, listings of areas affected, the numbers of customers without service, estimated restoration times, and ice distribution locations. The utilities also participated in press conferences and media interviews to help answer general questions and inform communities of the status of restoration.

Most telecommunications companies, however, did not conduct similar daily outreach following the storms. AT&T, Frontier Communications, Middleburgh Telephone, Margaretville Telephone, and T-Mobile issued press releases to inform customers of restoration progress.¹⁴ Other companies like Verizon, Cablevision, Comcast and Time Warner did not issue press releases following Irene; instead, these

¹⁴ Incumbent and competitive local exchange companies are required to comply with 16NYCRR §602.7 (f), which states “During major service outages of extended duration, the service provider shall make every effort to inform the general public of the details of the outage, including the areas affected and a schedule for expected service restoral.”

providers relied on their websites and social media for sharing information. Verizon stated that it did not believe that it would be feasible or realistic to issue daily press releases with estimated service restoration times given the severe, rapidly changing, and geographically widespread situation it faced. Verizon indicated that it tried to provide realistic estimates concerning restoration times for specific service-affecting conditions when customers called its service centers. We do not find Verizon's reasons for not issuing regular press releases compelling. Given that Verizon is the largest incumbent wireline phone service provider in New York and its past performance during extended storm outages, the Company has an obligation to keep its customers informed.¹⁵ The severity of Irene and Lee, and the rapidly changing storm environment, increased the need to provide Verizon customers with timely and accurate information. Issuing press releases is neither novel nor unduly arduous. We believe Verizon should have issued press releases daily and the issuance of press releases should be a general practice followed by all companies.

<p>Recommendation: During and following a major storm, disaster, or other emergency, all telecommunication providers should strive to issue press releases on a regular (daily) basis and provide a more accurate picture of the number of customers being affected along with an estimated time period of restoration.</p>

All of the electric utilities' websites provided restoration estimates, emergency safety information, instructions on reporting outage problems, and outage status by county, town and village. Central Hudson and NYSEG were the last utilities to provide job-specific restoration estimates. Also, Central Hudson's website map was unavailable at several times during the storm. Staff's periodic checks revealed that the Central Hudson map was unavailable in the early morning of at least two days. Central

¹⁵ In its 2006 Western New York Snow Storm Report, one of the Staff recommendations made to Verizon was, "During and following a major storm, disaster, or other emergency, Verizon should strive to issue press releases on a regular (daily) basis and provide a more accurate picture of the number of customers being affected along with an estimated time period of restoration."

Hudson determined that its Storm Central Outage Map was temporarily not functioning because the query used to populate the outage map became overwhelmed during the event. This issue was permanently fixed during the storm when the query was re-written to improve its efficiency in obtaining the required data.

Many municipal officials complained that NYSEG's website failed to provide accurate estimated times of restoration (ETR). The online information frequently did not match the dates and times when power was actually restored. Also, NYSEG updated ETR information on its website only once per day, at a time when other utilities were providing updates more frequently. NYSEG acknowledged in its report to us that its recently introduced website outage map needs to be improved to provide better customer service.

Various electric utilities also use additional means, such as automatic outbound dialing and mobile customer service centers, as well as newer forms of communication, such as email, text messaging, and social media (such as Facebook and Twitter). The use of alternative communication technologies is discussed later in this report.

Recommendation: Central Hudson and NYSEG should report on their enhancements for the provision of ETRs and their presentation on website maps.

COMMUNICATIONS WITH PUBLIC OFFICIALS

During a major outage, the electric utilities regularly hold conference calls with public officials (referred to as municipal calls) to advise them of restoration activities, address concerns, and identify priorities within an area. Participants in the calls can include representatives of the Company, Staff, and local city, town, and village officials. Some municipal calls may also have participants from the Governor's Office, County Officials, and Members of the State Assembly and Senate. A list of the municipal calls held for Hurricane Irene is provided in Table 2. Because public officials were

directly informed by the utilities, no municipal conference calls were held following Lee. Communications with public officials were also provided through blast faxes and emails.

Table 2: Municipal Conference Calls held between August 26 and September 4

Utility	Number of Pre-Storm Calls	Number of Post-Storm Calls	Date of Last Call
Central Hudson	1	6	9/2/2011
Con Edison	1	10	9/1/2011
National Grid	1	6	9/1/2011
NYSEG	0	31	9/4/2011
Orange and Rockland	0	10	9/2/2011
Total	3	63	--

The electric utilities used municipal calls as their means to convey information to public officials and to answer their questions. The topics discussed typically included damage assessments, the locations of outages, the numbers of customers affected, ETRs, and the locations for and times of dry ice distributions. For the most part, the municipal calls went smoothly. Some State Senate and Assembly members stated that they were not notified of the municipal call schedules and wanted to be included on the utilities' call lists going forward.

Most utilities maintained daily contact with such local organizations as highway departments and emergency management offices to coordinate their restoration efforts in the affected communities. In some instances, NYSEG used its municipal calls to coordinate restoration efforts and/or to identify and resolve locality-specific issues. As stated above, however, the municipal calls mainly serve to provide information to municipal officials, of whom a dozen or more may be participating on a given call, and therefore may not be the best venue or means for resolving locality-specific concerns.

Westchester and Putnam County officials reported that they had poor communications with NYSEG. Evidently, the officials were expecting to have someone from NYSEG on site at the county EOC headquarters, and that person apparently was

not present. NYSEG's Brewster division, which serves these two counties, was the most severely impacted area within the Company following Irene. We recognize that NYSEG's service territory is non-contiguous and includes portions of 43 counties and that it may be impracticable for NYSEG to maintain a physical presence in all 43 county EOCs. Nevertheless, NYSEG should have a local presence and direct communications with county officials where the impact from storms is significant. The Company should also look to improve communications with county offices where it does not plan to have a local presence because damage to the system does not warrant such coverage.

Recommendations:	NYSEG should provide a local presence in severely impacted areas and identify alternative means to improve communication with county offices.
	All utilities should extend invitations to local and state elected officials representing districts in their service territories to be included on their municipal call lists.

ALTERNATIVE COMMUNICATION TECHNOLOGIES

Utilities continue to expand their use of new technology to communicate with their customers during storm emergencies. During Irene and Lee, many utilized automatic outbound dialing as well as email, text messaging, and social media, such as Facebook and Twitter. A summary of the communication methods used by the utilities is shown in the following table:

Table 3: Consumer Outreach Methods Used by Companies

Company	Automated Dialing	Text Messages	Email	Facebook	Twitter
Central Hudson	✓	✓	✓	✓	✓
Con Edison	✓	✓	✓	✓	✓
National Grid	✓	✓	✓	✓	✓
NYSEG	✓	✓	✓		✓
Orange and Rockland	✓	✓	✓		
Mid-Hudson Cablevision		✓	✓	✓	✓
Cablevision	✓		✓	✓	
Comcast	✓				
AT&T				✓	✓
Frontier Communications				✓	✓
Sprint Nextel				✓	✓
TDS Telecom				✓	✓
T-Mobile				✓	✓
Time Warner Cable				✓	✓
Verizon				✓	✓
Verizon Wireless				✓	✓

We observed that some electric utilities made considerable advances in their use of the new technologies. For example, National Grid provided updates on its storm response and allowed customers to report issues on its Twitter account. Central Hudson rolled out a new smartphone application that enables customers to access storm-related information. As of February 2012, over 5,300 customers downloaded Central Hudson's app. Con Edison was among the more than 50 winners of the 2011 Bulldog Digital/Social Public Relations Award for Outstanding Achievement by Agencies and Individuals in Public Relations and Corporate Communications. The award is given by Bulldog Reporter, publisher of the Daily Dog online trade journal, which is considered to be the public relations/communication industry's largest circulation publication. Bulldog Reporter awarded its "Best Crisis Response Gold" to Con Edison for its response to Hurricane Irene.

We believe that these newer technologies can be well used by the utilities. Automated dialing systems, social media, email, or text messaging can be effective communication tools for interacting with customers. For example, customers could choose to provide cellular telephone numbers, in addition to their home telephone numbers, for notification of outage updates. Cellular phones are often the primary means of communication available for residents during power outages, because they do not rely on electricity to function. Customers who opt to participate in such a program could regularly receive updated information or be notified of changes in their estimated restoration time.

Similarly, while the percentage of customers who currently interact with utilities using social media, such as Facebook and Twitter, may not be large, it is reasonable to expect that the number of customers using these services will grow in coming years. As social media continues to grow, utilities must recognize the impact these new information services can have on their communication strategies. Correspondingly, as social media becomes more pervasive, utilities should continue to grow their presence in this area.

We appreciate that the successful use of email, text messaging and social media will depend upon the willingness of customers to provide secondary contact information. We believe there is sufficient customer interest in receiving timely information during an outage for customers to be willing to voluntarily provide their secondary-contact to the utilities.

Recommendation:	All utilities should investigate ways to continue to expand the use of newer technologies to communicate with customers during outages (i.e., email, text messaging, and social media) and report their findings to Staff.
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ELECTRIC AND GAS SERVICES

The following section provides our review of the five investor-owned utilities that were affected by Hurricane Irene and/or Tropical Storm Lee. This report does not assess LIPA's performance; pursuant to a memorandum of understanding with LIPA the Department is performing an independent review of LIPA's storm performance. LIPA will be referred to here when necessary to provide a complete representation of the damage that occurred to the electric and gas systems and in reference to the mutual aid process.

During large storms, the electric utilities open and staff storm centers that serve as their command locations for service restoration.¹⁶ Storm centers are essential, allowing the utilities to monitor and report on infrastructure failures and coordinate such functions as crew management, logistics, and material procurement. Based on the storm track, Con Edison was first to open its storm center, the Corporate Emergency Response Center, on Saturday morning. The other utilities completed their preparations and opened their storm centers throughout the day Saturday and early Sunday morning. All of the utilities were fully prepared well in advance of Irene's arrival in their respective service territories.

In general, the method used for restoring electric service considers public safety first and prioritizes the repairing of facilities such that power is restored to the largest groups of customers first. To accomplish this, the electric utilities follow a guide outlining the order that systems should be restored based on safety and speed of restoration. The general order is listed below, but it should be noted that safety and restoration activities may be performed in parallel where different skills are required.

¹⁶ The storm centers are referred to by differing names in the utility emergency plans. However, each performs essentially the same functions.

Table 4: Utility Priorities During Restoration

Health and Safety Concerns	Repairs to the Electric System
<ul style="list-style-type: none"> • Responding to safety concerns, including live downed wires • Restoration of key facilities, such as hospitals or police stations • Feeders with critical customers or high-priority customers 	<ul style="list-style-type: none"> • Transmission/sub-transmission facilities, including substations • Distribution substations • Three-phase primary • Single-phase side taps • Secondary services and individual distribution transformers supplying small groups of customers

The restoration of natural gas service differs from that of electric service. When an outage occurs on the gas distribution system there is the potential for air to get into a natural gas pipeline and create a hazardous situation. As a result, the local distribution companies (LDCs) must go through a purging process to remove air from each pipeline before it can be restored. This process can only be completed by shutting off each customer at the meter. Unlike the electric system, the company must visit each customer's meter to restore the gas system.

Once the natural gas system is repaired and natural gas pipeline has been purged, the relighting (or reenergizing) process for individual customers can begin. This process requires that each company visit every customer. For this process the LDC must ensure the integrity of the interior house piping and purge it of air. Once this has been completed the relight of each individual piece of customer gas-fired equipment can begin. This entire process generally takes 20 minutes per customer to complete and requires physical access to the customer's internal equipment.

The restoration of natural gas service impacts the restoration electric service in areas that experience flooding. Electricity can provide a source of ignition for a building containing a flammable mixture of natural gas in the air. Flooded natural gas-fired equipment can introduce such a flammable mixture into a building and electricity

cannot be reintroduced without first confirming that natural gas is not present in the building.

ELECTRIC OPERATIONS DURING IRENE

SUMMARY OF ELECTRIC SERVICE INTERRUPTIONS

Hurricane Irene struck Long Island with its northeast quadrant, the strongest section of the hurricane. By noon, the storm caused outages to 523,000 LIPA customers, or nearly half of all customers in its service territory. At this time, there were 997,000 outages statewide and the majority of the damage was downstate. With Irene impacting the different service territories at different times, the individual company outage counts peaked at various times on Sunday. The sum of the peak outages for each company totals 1.1 million customers.

As the storm moved inland, the number of customer outages upstate continued to climb while the utilities downstate were beginning to restore customers. Continued high winds behind the storm's center caused additional damage. Because a significant number of downstate customers had been restored in the afternoon, the total number of customers statewide without electric service reached a second, lower peak of 950,000 at 10:00 P.M. The distribution of the affected customers at this time, by Company, can be seen in Figure 2 below. This chart represents the overall condition of the electric utilities as the storm system exited the state. Of the total customers without service on Sunday night, over a third are served by LIPA. National Grid had the next highest number of customers affected, followed by Con Edison, NYSEG, Central Hudson, and, Orange and Rockland.

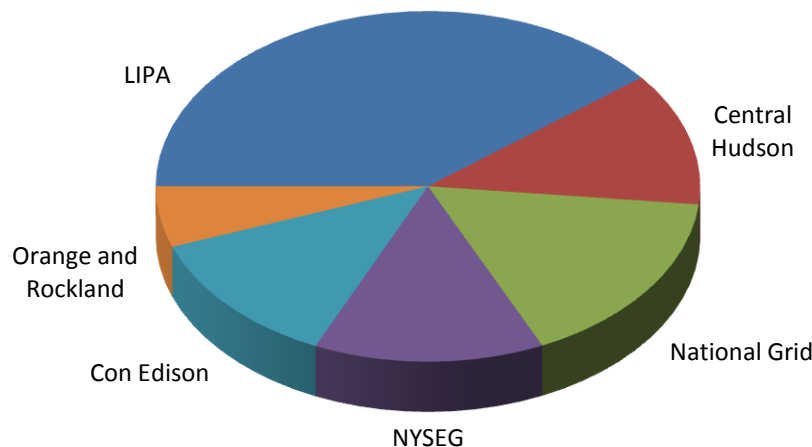


Figure 2: Outage Distribution as of 10:00 p.m., August 28

New York City experienced less wind and storm surge than originally predicted. Even so, Con Edison had 143,000 customers without service at its peak. Westchester, Queens, and Staten Island sustained more significant damage compared to other areas served by Con Edison because they are served primarily by overhead utility lines that are vulnerable to storm conditions. In contrast, the utility infrastructure in Manhattan is located entirely underground and experienced minimal damage. Westchester County was hit hard, with over 105,000 customers affected, or 30 percent of the customers located there.

National Grid experienced the largest number of customer outages among the investor-owned utilities, peaking at 156,000 customers without service. Its Eastern Division was hit the hardest, especially in Schoharie County. At its peak, 28% of the customers in National Grid's Eastern Division were without service. While the eastern part of the Central Division also sustained damage, most of National Grid's Central Division and all of its Western Division were unaffected by the storm.

A number of NYSEG's divisions were heavily affected by Irene, resulting in a company-wide peak outage of 131,000 customers. Customers in the Brewster Division, which serves parts of Westchester, Putnam and Dutchess Counties, were most

severely affected. The Brewster Division peaked at nearly 60,000 customers without service, or about 70% of the customers served. Several other NYSEG divisions also experienced serious damage, including the Plattsburgh, Liberty, and Oneonta Divisions, with 46%, 37%, and 34% of their customers without service, respectively. The Binghamton and Mechanicville Divisions sustained less damage with 11% of customers without electric service combined. Similar to National Grid, NYSEG's divisions in Western New York were not affected by the storm.

All of Central Hudson's territory was in the storm's path, resulting in 118,000 customers without service company-wide, or 39% of its customer base. All areas served by the Company were heavily impacted; its Kingston and Catskill Divisions were hit the hardest, with 79% and 63% of customers without service in these areas, respectively. These divisions serve Greene and Ulster Counties.

Orange and Rockland serves Orange, Rockland, and Sullivan Counties in New York and portions of New Jersey and Pennsylvania. Within New York, Hurricane Irene resulted in a peak of 56,000 customers without power, or 26% of the customers served in the State. The Company also had 31,000 customers in New Jersey and Pennsylvania affected by the storm.

On Sunday, September 4, severe thunderstorms passed over New York in the early evening hours. A tornado accompanied the thunderstorms in the vicinity of Amsterdam. These storms caused approximately 30,000 new outages in National Grid's service territory, 12,500 new outages in Central Hudson's territory, and 5,500 new outages in NYSEG's Mechanicville Division.

STORM PREPARATION

In the days leading up to severe events, such as Hurricane Irene and Tropical Storm Lee, the electric utilities prepare for restoration activities and begin implementing the guidelines contained in their Emergency Plans. For Irene, Con Edison

implemented its Corporate Coastal Storm Plan (CCSP) for the first time. The CCSP augments the Emergency Plan typically used for storms and provides a decision matrix that assists in preparing for major coastal events and hurricanes. The actions recommended in the CCSP are categorized based on the time remaining until the storm's arrival, beginning at 120 hours (5 days) before the storm. For example, 12 hours before the storm was expected to arrive, the Company began to relocate all remaining equipment, vehicles, and high voltage test trucks out of the storm path and flood zones to safer locations. Orange and Rockland, a sister company of Con Edison, also followed the timeline provided by the CCSP. Due to Con Edison's and Orange and Rockland's shared corporate oversight during Irene, the use of the CCSP by Orange and Rockland was effective. Orange and Rockland should, however, formalize its use of the CCSP as part of its own emergency procedures.

<p>Recommendation: Orange and Rockland's emergency plan should formally incorporate the Corporate Coastal Storm Plan.</p>
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Like most others, the electric utilities closely monitor the forecasts and predictions for the weather events. The utilities participate in conference calls hosted by the National Weather Service. Some also subscribe to a private weather service for pinpoint forecasts for their service territories. Using the weather forecasts, the utilities make determinations about how to pre-stage crews, materials, and equipment for the areas likely to be affected by the storm. The forecasts also enable the utilities to estimate the amount of damage and develop staffing levels based on the predicted severity of the event. Additional details on the staffing plans are provided later in this report in the Crew Levels section.

The emergency plans require various actions to be taken to prepare for a storm. To track that all activities are performed, most of the emergency plans identify the actions in the form of a checklist. Such tasks include arranging meetings and

conference calls between internal company personnel, local municipal officials, the Department, contractors, and regional mutual assistance groups. Inventories are taken and supplies are obtained as needed. Communications equipment and alternate storm and call centers are tested and readied. All ongoing construction and maintenance is finished or stopped at a reasonable point, ensuring that the electric systems are as whole as possible.

For larger storms, staging areas are established to support restoration efforts. The staging areas are important because they make materials and equipment, such as poles and conductor wire, easily accessible. The areas may also be used to process crews and park trucks overnight. In addition to using their own property for staging areas, some companies have pre-arranged agreements with private and public landowners to use their facilities for staging areas during restoration events. These arrangements are made for locations throughout the companies' service territories with easy access to highways and enough space to support a large volume of crews, materials, and equipment.

During Irene, National Grid used Columbia Greene Community College (Hudson), Kmart (Latham), Rotterdam Square Mall (Schenectady), Fulton Montgomery Community College (Johnstown), Wal-Mart (Ticonderoga), and multiple substations as staging areas. The staging area located at Rotterdam Mall, however, had to be relocated due to flooding. Con Edison used the Staten Island Mall and Westchester Community College (Valhalla) as staging areas for Hurricane Irene. The Company also staged at Citi Field in Queens, however, it had to be relocated to Cunningham Park, also in Queens, because of concerns that the traffic associated with the US Open Tennis Tournament would interfere with the ability of crews to operate efficiently.¹⁷

¹⁷ It was originally thought that the sport events at Citi Field would have been cancelled, however, the storm's impact was not as severe as predicted thus allowing the events to commence as originally planned.

Orange and Rockland used primarily Company-owned property, including the Middletown Operations Center, as its staging areas. In addition, the Company used the Galleria Shopping Mall (Middletown) and the Sheraton in Mahwah, NJ as staging areas for mutual assistance and contractor crews. Despite being in New Jersey, the Mahwah location was effective with easy access to highways and its close proximity to the New York State border. Central Hudson and NYSEG used their headquarters, offices, and substations as staging areas. In Brewster, NYSEG used a large Home Depot parking area during Irene because it was near a major highway, adjacent to a diner, and was close to fueling stations.

Overall, the utilities properly staged equipment and established useful areas for the high level of mutual assistance that was used to respond to Hurricane Irene. In some instances, however, locations were secured just days before the storm. For emergency planning, it would be better to have formal agreements in place for potential staging sites to ensure their availability. Orange and Rockland stated in a response to a Staff request that it has already identified additional locations and it will be formalizing those relationships, potentially through written agreements.

Recommendation:	The electric utilities should formalize agreements with property owners to temporarily stage crews, materials, and equipment during restoration at strategic locations that would be useful for future restoration efforts.
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With the forecast of widespread flooding accompanying Irene, many electric utilities built sandbag perimeters around their facilities at risk. The companies also staffed at-risk substations, and monitored flooding, so the sites could be shut down, if needed to minimize damage from rising waters. The threat of flooding from tidal surges led Con Edison to evacuate and relocate facilities identified in its storm.¹⁸ Action

¹⁸ Con Edison's list of "Potentially Affected Equipment and Facilities" reflects areas defined by the Sea, Lake and Overland Surges from Hurricanes (SLOSH) maps and locations known to have a flooding history.

was taken in Brenton Beach to limit the damage to feeders from potential flooding in this area. Historically, the Mohawk River floods in the Stockade area of Schenectady. As a result, National Grid proactively moved vehicles out of its Broadway Schenectady location in advance of the storm. In this instance, flooding did not occur and the Company returned to this site after Hurricane Irene passed.

Using their respective Emergency Plans, the electric utilities were able to adequately prepare for the restoration efforts needed following Irene. Our investigation found that Central Hudson, for example, staffed both its primary and alternate Call Centers located on opposite sides of the Hudson River. This was done to ensure that an alternate plan was available in the event that a Call Center failed and the bridges crossing the Hudson River were closed. Con Edison, also anticipating transportation issues, staffed storm response positions well in advance of the arrival of Hurricane Irene. In fact, Con Edison staff was virtually stranded in New York City after the municipal transit system was shut down. Based on our review, we are satisfied that the electric utilities properly followed the requirements of their Emergency Plans prior to the storm's arrival.

DAMAGE ASSESSMENT

To assess the level of damage sustained by the electric system, trained personnel are sent out to survey and document the damage, and forward their observations to the utility's operations center. Accurate damage assessment is a critical function in the early stages of the restoration process because it provides the information that allows the companies to determine how many crews are needed for the restoration. A good assessment permits the utility to evaluate how much and what type of equipment and material will be needed, and refine its customer outage estimates. The information is also used to prioritize crew assignments and to determine estimated restoration times.

Transmission facilities are inspected for damage by helicopter patrols and/or foot patrols. Damage assessment of the distribution system is generally performed in two phases. The initial assessment inspects critical infrastructure and the three-phase portion of distribution circuits. The three-phase sections of lines are the “backbone” of the distribution system and they receive priority. Where damage from a storm is severe, a second, more-detailed assessment occurs that examines the single-phase portion of the circuits. The assessments identify broken poles, spans of down wire, damaged transformers, and trees on wires. The observations made by the assessors are compiled and the outage management system is updated to reflect these known conditions, providing the utilities an operational view of the electrical system. The information gathered from the assessments can be extrapolated to estimate system damage for an entire area.

Typically, the damage assessors are engineering inspectors, design inspectors, or field experienced employees knowledgeable in the construction and operation of the transmission and distribution system. Utilities may also draw personnel from other departments who have field experience, such as a gas mechanic, and it will train these employees to serve as an assessor during a storm.

Given the likelihood that Hurricane Irene would produce significant damage, all utilities made a conscious effort to procure additional damage assessors, using means similar those used to obtain extra crews to assist with restoration efforts. National Grid was able to relocate 60 damage assessors from its Central and Western Regions to assist in the surveys. All of the other electric utilities supplemented their in-house damage assessors with contractor-supplied assessors. These contractors are typically used to perform facility inspections, thus they have local field experience and they are knowledgeable in the construction of the transmission and distribution system. The only training they required involves the documenting and reporting process for conditions found in the field.

Con Edison arranged for numerous contractors to assist them with damage assessment on Thursday, August 25 because it expected a high level of damage and had concerns regarding coastal flooding in New York City. The contractor damage assessors arrived on Saturday, August 27 and the majority of them were prepositioned in the Bronx/Westchester Division on Sunday, August 28. Con Edison used a sizable workforce to perform damage assessment overnight. To accomplish this, the Company scheduled two 12-hour shifts a day, which necessitated a larger workforce. Where the workforce was in place, Con Edison used them for damage assessment on Monday and Tuesday. On Wednesday, most of the contracted crews were released since the damage assessment assignments were completed.

NYSEG and Orange and Rockland also obtained 88 and 50 additional contractor assessors, respectively. Staff favorably views the electric utilities incorporation of additional resources into the damage assessment process and we encourage this practice for major storm events to supplement the damage assessors. For this approach to be successful, pre-storm training, user-friendly tools, quality documentation, and management support are necessary.

Recommendation:	Each electric company should develop procedures relating to the use of contracted damage assessors, including training requirements. Their Emergency Plans should identify when these procedures would be used.
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Following a major storm, the faster the damage assessment takes place, the better prepared the utility is to restore power in an efficient manner. Based on the available weather forecast, formal damage assessment functions were initially scheduled to begin on the morning of Monday, August 29 for most companies. National Grid's planning group used its experience of Hurricane Floyd as its model to respond to Hurricane Irene. Based on this experience, it scheduled a smaller number of assessors for Sunday. Table 5 provides the damage assessment staffing from August 28 through September 5. The table shows assessor levels were ramped up by approximately 200%

between Sunday, August 28 and Monday, August 29 confirming that, in general, the original schedule was followed.

Table 5: Damage Assessment Staffing from August 28 through September 4

	Sun Aug 28	Mon Aug 29	Tues Aug 30	Wed Aug 31	Thurs Sept 1	Fri Sept 2	Sat Sept 3	Sun Sept 4
DAY SHIFT								
Central Hudson	0	48	62	58	52	52	37	34
Con Edison	11	380	357	180	110	20	41	-
National Grid	34	77	87	87	70	33	-	-
NYSEG	45	77	118	139	102	-	-	-
Orange and Rockland	71	92	150	152	85	29	11	-
OVERNIGHT SHIFT								
Con Edison	99	115	136	60	65	-	-	-
Orange and Rockland	10	10	10	10	10	10	-	-
Total Assessors	270	799	920	686	494	144	89	34

Our investigation determined that while the utilities did an appropriate job of assembling damage assessors prior to the storm, the assessors were not always deployed as soon as conditions allowed. Field conditions experienced in certain areas on Sunday may not have been as severe as initially thought, thus allowing damage assessment to begin earlier. NYSEG took advantage of field conditions in the Oneonta and Liberty Divisions and started initial damage assessment on Sunday, August 28. Damage assessment was also activated in the Brewster Division on August 28, but was difficult to perform in Westchester County due to inaccessible roads and bridges. The damage assessment activities were adjusted to accommodate access and travel issues.

We understand that keeping personnel safe is the top priority and we do not expect assessors to be put in harm's way. Restoration plans need to be dynamic, and companies should determine when conditions are safe, to begin formal damage assessment and mobilize their personnel accordingly. Many utilities stated that an informal assessment of damage was performed by the line crews who responded to conditions on Sunday afternoon, August 28. We recognize that information about the storm's impact was gathered this way, but it should not be viewed as the equivalent of a

formal damage assessment. A delay in the start of the formal damage assessment will affect the decision making process used in the restoration effort. The speed and accuracy of the transfer of damage information to the operations center will impact the length and cost of the overall restoration.

Further, damage assessments help utilities to identify and prioritize storm-affected areas. The utilities need to find ways to simplify and expedite the data collection process to improve response times and to restore service efficiently. Technology applications play an important role in electric utility operations, and we believe it also has an important role in damage assessment. Incorporating the use of mobile computing, GIS, and communication technology into the damage assessment function will have a positive effect on emergency response. These technologies also support the data flow from the field to the operations center, which can lead to additional benefits in material management, logistics, mapping, and communications. Central Hudson, NYSEG, and Orange and Rockland used GPS units on patrols and found them to be useful. In addition, some of NYSEG's contractors had compatible mobile devices and were able to use them during this event. Data collected by Company damage assessors was communicated directly to the outage management system; the contractor's data was downloaded into a spreadsheet first. During Hurricane Irene, Central Hudson found that manually tracking damaged equipment was time-consuming and created a lag between when the circuit was patrolled and when information was entered into the outage management system. Staff encourages Central Hudson to investigate mobile data collection solutions for damage assessment as the Company indicated it would in its lessons learned. We suggest that all investor owned electric utilities consider incorporating technology into their damage assessment process.

Recommendation:	National Grid and Con Edison should investigate the use of mobile data collection for damage assessment by company and contracted personnel and report their finding to Staff.
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CREW LEVELS

To restore service in a timely manner following major storms, the electric utilities obtain assistance from other utilities and contractors to supplement their workforce levels. Since major storms are infrequent, the costs to temporarily employ external crews for storms are lower than the costs the companies would incur if they were to permanently retain high crew levels throughout the year when normal conditions exist. This process of sharing crews works effectively because the rules, guidelines, and procedures are worked out in advance by established mutual assistance groups. These groups foster relationships, respect, and trust among their members, which helps to streamline the overall process. Obtaining crews ahead of storms can be difficult when forecasts are highly variable or there is a large potential for wide-spread damage. A utility may be reluctant to release its crews to other utilities before the total effects of a storm are realized within its own service territory. Supplemental crews for storm restoration may also be obtained by direct contact with contractors, including those normally used by a company.

The New York Mutual Assistance Group (NYMAG) holds conference calls before and during storms, enabling utilities to discuss weather reports, anticipated damage, crew availability, and to request resources.¹⁹ Between Thursday, August 25 and Saturday, September 3, NYMAG held 17 conference calls to prepare for and respond to Hurricane Irene. The initial forecast for Irene indicated the potential for severe damage in the lower portion of New York State, including damage resulting from coastal flooding in New York City and on Long Island. As a result, the allocation of crews available through NYMAG prior to the storm favored downstate.

Prior to the storm, National Grid and NYSEG relocated approximately 50 of their own crews from central and western New York to assist in the restoration

¹⁹ NYMAG is a regional group of electric utilities who assemble together for the planning and implementation of a coordinated effort to restore transmission and distribution systems.

activities.²⁰ Consistent with the weather forecasts and anticipated damage, NYSEG assigned 40% of the crews moving east to its Brewster Division and 40% to its Mechanicville Division. The remaining 20% were prepositioned in the Liberty Division.

Because Irene affected 17 states along the east coast, requests for assistance were high and some utilities were lobbying others for crews. Consequently, the New York electric utilities had to reach out well beyond the typical areas and locations to secure additional utility crews or contractors. In an effort to help determine crew availability, NYMAG included other regional mutual assistance groups in several conference calls, including the Mid-Atlantic Mutual Assistance Group, Southeast Electric Exchange, North East Mutual Assistance Group, Great Lakes Mutual Assistance, and the Mid West Mutual Assistance Group.

Recommendation:	Each electric utility should expand its emergency plan to include procedures for obtaining crews from distant states. The emergency plans should include contact information for utilities, contractors, and mutual assistance groups and acknowledge travel and rest time restrictions before the crews can be deployed into the field.
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Despite their efforts to obtain additional crews ahead of the storm, many of the utilities' crew compliments were below the levels identified by their operation sections. Table 6 shows the number of additional line crews requested by each company before the storm and the number of line crews that were available to work on Sunday and Monday, August 28 and 29. Con Edison, National Grid, and NYSEG requested a significant amount of assistance. Despite its request, NYSEG was slow in obtaining crews and did not attain the 200 crews it originally requested until September 2. Compounding the matter, NYSEG increased its request to secure 500 crews after the storm struck. NYSEG held all contractors working for Iberdrola in New York and

²⁰ NYSEG has access to all crews employed by Iberdrola in New York, including Rochester Gas and Electric's crews.

prestaged them on Saturday, August 27, in the areas most likely to be affected by Hurricane Irene.

Table 6: Line Crews Requested Prior to Irene vs. Line Crews Supplied

	Line Crews Requested Prior to Storm			Line Crews Received			
	Mutual Aid	Contractor	Total	Sunday, August 28		Monday, August 29	
Company				Total Crews Received	Percent of Request	Total Crews Received	Percent of Request
Central Hudson	30	12	42	12	29%	42	100%
Con Edison	300	237	537	217	40%	273	51%
National Grid	150	215	365	288	79%	292	80%
NYSEG	0	200	200	58	29%	60	30%
Orange and Rockland	80	0	80	36	45%	45	56%
Total	560	664	1,224	611	50%	712	58%

Orange and Rockland also had difficulty obtaining crews. While the Company made mutual assistance request for 80 line crews in advance of the storm on August 25, the crews arrived incrementally throughout the week. Central Hudson notified the contractors who work for it of the Company's intention to use them during the restoration. It also requested 30 mutual assistance line crews on August 26 once the weather models had stabilized. Central Hudson states that additional crews were not able to be obtained without the Company accepting increased risks and expenses to their customers.²¹ By securing and efficiently using a reasonable number of crews, Central Hudson states it was able to complete a timely, safe, and efficient restoration because the mutual aid crews were available to work on Monday, August 29.

During Irene, almost 500 internal line crews were used by the investor-owned electric companies to respond to Irene. The utilities also received contractor crews and utility crews from Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa,

²¹ Central Hudson stated at the time it would have needed to decide to secure crews from far away, the forecast for its territory was uncertain. If crews were obtained and little damage was realized, the cost for those crews in the days preceding the storm, potentially at a double-time rate, was excessive according to Central Hudson.

Missouri, Mississippi, Wisconsin, Canada, Michigan, Indiana, Ohio, and Florida. As part of its efforts to obtain additional crews, NYSEG flew in 12 line mechanics from Nebraska and supplied them with bucket trucks that had been retired, but were still available.

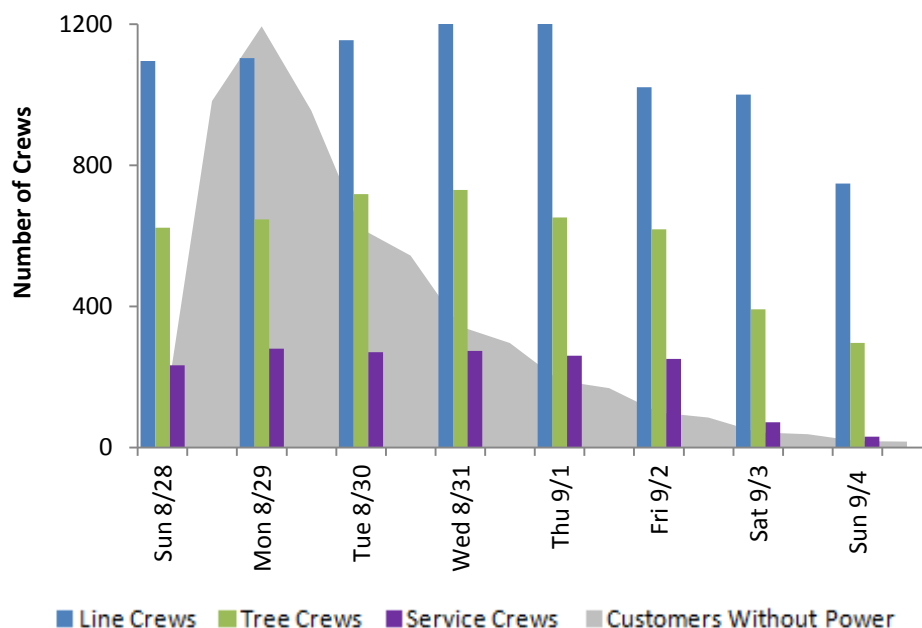


Figure 3: Crew Availability Statewide

From a statewide perspective, Figure 3 shows the hundreds of crews that the New York's investor owned utilities retained to respond to the storm. In the figure, the blue bars represent the total line crews responsible for repairing damage to the electric system. The green bars show the number tree crews used to remove vegetation. The grey area in the background indicates the relative number of customers without power. The utilities continued to obtain crews as they became available through mutual assistance groups and other outside resources. The total number of line crews reached its maximum on Wednesday, August 31, four days into the storm.

Providing support for additional crews was mentioned by several utilities as an area where opportunities for improvement exist. Acquiring additional crews rapidly can reduce the total length of the restoration but the ability to support these crews has proven to be difficult. The host utility must ensure the availability of materials, fuel, food, and accommodations. The host utility must also provide the crews

with guides, coordinate repair activity, maintain security, and communicate safety, construction and design practices. With all these responsibilities, the arrival of additional crews can present management difficulties, particularly during a major restoration effort. Careful planning can ease the integration of additional crews into the restoration effort. NYSEG found that the methods that had been used for smaller events to receive and deploy crews became time consuming and challenging when applied to large numbers of crews. Staff recognizes that Central Hudson and National Grid have made improvements since the February and March 2010 storms, and we appreciate the companies' acknowledgements that additional improvements can be made in this area. Staff therefore suggests that all investor owned utilities examine and share their best practices related to support and deployment of mutual assistance crews.

RESPONSE TO DOWN WIRES

During the height of the storm, restoration work was directed to responding to emergency calls and to making conditions safe by isolating damaged facilities affected by down trees, fallen limbs, and washouts. One of the greatest safety issues during storms is when wires are down or hanging low. Given the hazards they present, utilities stress that the damaged lines should be treated as "live" and they should be avoided. Unfortunately, following Irene there were two civilian fatalities associated with a downed power line. On August 28, a man was electrocuted when he tried to rescue a boy exposed to electricity from the down wire. Emergency responders were first on the scene and took the boy, who was severely burned, to a hospital in Suffern. He was transferred to the burn unit at Westchester hospital where he eventually died. The incident occurred in Monsey, NY, located in Orange and Rockland's service territory. The Department performed a separate investigation of this incident;

the findings of which are presented in separate report under Case 11-M-0481, which is appended to this report.

Table 7 lists the number of locations where a down wire was reported to the electric utilities each day. There were a total of 13,912 locations, with about half being reported the day of the Hurricane and over 80% being reported in the first three days. NYSEG's Brewster Division accounted for nearly half of the Company's total down wire reports. As restoration progressed, the number of down wires reported decreased as would be expected.

Table 7: Number of Lines Down Reports Received per Day

Company	Aug 28	Aug 29	Aug 30	Aug 31	Sep 1	Sep 2	Sep 3	Sep 4	Sep 5	Sep 6	Total
Central Hudson	1,149	290	225	105	59	55	57	35	72	24	2,071
Con Edison	1,614	361	243	206	174	0	0	0	0	0	2,598
National Grid	411	96	97	24	25	11	8	0	0	0	672
NYSEG	2,579	860	644	362	221	131	71	39	26	26	4,959
Orange & Rockland	1,332	1,055	572	286	183	114	37	33	0	0	3,612
Total	7,085	2,662	1,781	983	662	311	173	107	98	50	13,912

To safeguard down wires, the utilities either deploy line crews directly to the sites or send personnel, designated as "wire guards", to maintain a safe area around the compromised facilities until the line crews are available. The number of wire guards or site safety personnel used for Irene was based on the weather forecasts, the storm classification, and the number of down wires reported during the course of restoration. Wire guards are dispatched to cover conditions reported directly by customers or by utility personnel performing damage assessment activities. Upon arrival, the wire guards may relay information about the scene to help prioritize the utilities' response or to eliminate the unnecessary dispatching of line crews should the wire belong to a telephone or cable provider. During large events, the volume of wires down exceeds available resources and the utilities must prioritize which locations are guarded based on public safety.

The number of wire guards or site safety personnel initially identified for Irene was based on the weather forecasts and, in some cases, the expected storm classification. The utilities then managed the number of guards they used based on how many wires down reports they received. As a result, changes in staffing levels tended to be more reactionary. Adding personnel takes time and may be difficult if the initial staffing levels are particularly low. Therefore, Staff believes that companies should be more aggressive when planning for the number of wire guards, particularly when circumstances promote the likelihood of downed wires. For example, Con Edison has fairly detailed charts within its emergency plan to identify the category of an event and minimum staffing levels. The Company also identifies conditions such as extended periods of rain, ice accumulation, and heavy foliage which may affect the projected effect of the storm. It does not, however, modify the staffing requirements to account for the projected increase in damage. When developing its staffing levels, a company should consider past performances in which it had appropriate staffing levels and information learned from other utility best practices.

Recommendation:	All electric utilities should better define minimum staffing requirements for the number of wire guards to be used in their emergency plans. The requirements should also identify alternate staffing levels when conditions, such as a hurricane, will likely cause an increase in the number of down wires.
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Most companies train their employees in both the electric and gas departments to be wire guards. Qualified wire guards typically come from field based functions, such as meter readers, bill collectors, and gas mechanics. As a result, they are familiar with safety procedures and have a good working knowledge of the service area. While acquiring wire guards from various sources within the company is a good strategy to maximize the number of wire guards available, the utilities must anticipate that these individuals may be needed to perform their normal work function as part of responding to the storm. This was evident during Irene where a higher than normal amount of gas

services were affected by the storm and gas mechanics were needed to secure and restore the gas system. Given the high level of down wires, some companies used outside vendors during Irene to supplement their wire guard staffing levels. For example, Orange and Rockland used 25 contactors that are normally used by the Company to test for stray voltage who, as part of that function, are trained to establish and maintain safe perimeters when needed.

Companies need to be cognizant of how to effectively utilize other available resources when assigning wire guards. Therefore, written procedures should be modified to prevent any deficiencies or concerns as to the availability of resources acquired from other departments and include alternate sources for obtaining wire guards.

Recommendation:	All electric utilities should modify their Emergency Plans to identify the means to obtain supplemental wire guards through contractors during or prior to an emergency when employees may not be available to serve as guards because they are needed for alternate functions.
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In addition to guarding down wires, the utilities must manage its response to fix the unsafe conditions. Orange and Rockland, Central Hudson, and NYSEG did not identify in their reports the specific activities taken during Irene to assist in clearing hazardous and impassable roads due to down wires and trees. National Grid stated that it uses MWorks, a computerized automated tracking system, to manage down wire jobs. MWorks assists service department personnel to ensure that wire down information received from the field is processed quickly and consistently; a function that the line department segregates manually which can be time consuming for a storm of this magnitude.

Con Edison uses “municipal field liaisons” with its Company crews to assist municipalities to clear hazardous roads due to down wires. Since 2006, Con Edison has improved its process and the refinements greatly benefitted the Irene storm restoration

effort. The Company's response level met the municipalities' needs and made for well coordinated road clearance work. Calls to dedicated telephone lines from municipal officials, police, and fire departments were processed through Con Edison's control centers to coordinate this effort. As each telephone call was processed, a municipal field liaison was assigned to provide on-site assistance, to prioritize work to ensure public safety, and to facilitate road clearing duties. Constant communication was maintained on the status of the road clearing effort. Staff believes the use of municipal field liaisons provides a means to increase efficient use of crews, particularly in hard hit communities, to quickly remove hazardous road conditions, and to improve communication.

Recommendation:	All electric utilities should modify their Emergency Plans to define when it would be appropriate to use municipal field liaisons or a similar process to facilitate the removal of hazardous conditions.
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RESTORATION OF SERVICE

The Utility Companies' objectives during any storm restoration are to make conditions safe, manage repairs efficiently, and restore customers as quickly as possible. Delays due to bridge closings, impassable roads, and flooding made the restoration task even more challenging. The restoration strategies utilities use target critical facilities, sensitive customers, and restoring service to the most customers in the least amount of time. During the initial restoration period of a large storm, field crews are directed to perform switching operations to restore customers quickly by isolating damaged facilities.

In this instance, full scale customer restoration began on Monday, August 29 for all the utilities. Figure 4 illustrates the rate of restoration throughout the state for the investor owned utilities, combined. The line has a steep decline soon after the storm, showing that the most rapid rate of restoration was occurring. The line flattens out with time because it takes longer to restore power in heavily damaged areas and

many repairs only result in a small number of customers being restored. In the field, the utilities generally carried out a well-planned response to Hurricane Irene directing their available resources effectively as field crews were acquired, mobilized, and began working. Approximately 286,000 (50%) customers were restored Monday and 403,000 (70%) were restored by Tuesday.

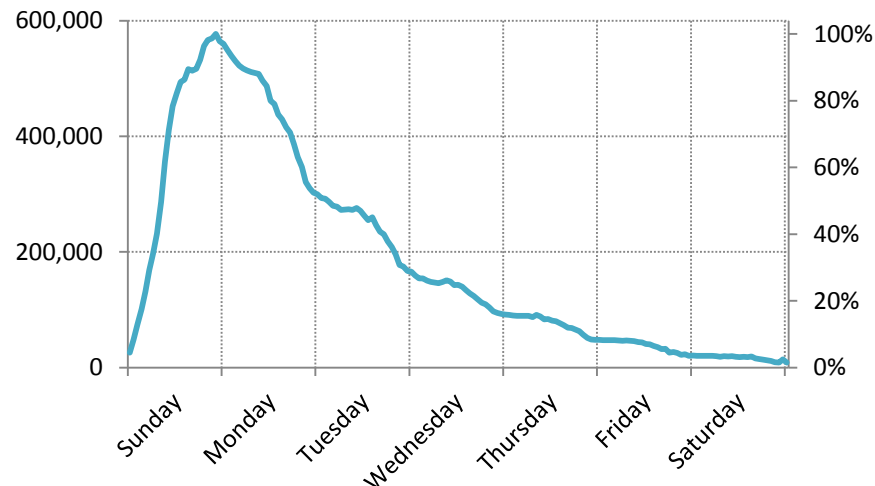


Figure 4: Customer Outages (Investor Owned Utilities)

Transportation, communication, and even the ability to use bucket trucks and other heavy equipment, became a challenge following Irene. Central Hudson noted that road washouts were common in Greene and Ulster Counties, forcing crews to drive a distance to get around the washouts. For example, Route 23A in Tannersville was closed, requiring crews to travel 90 additional minutes through Windham to reach the Tannersville area. In many areas, the ground was saturated which limited normal accessibility for trucks and equipment. Some Companies noted that crews had to set poles by hand, climb poles, and use special equipment to make repairs that would normally be made by a bucket truck. NYSEG brought in off-road equipment from Plattsburgh and used off-road equipment provided by contractors. As a result, many repairs took longer than normal.

During the Hurricane Irene restoration, several electric utilities had to also address flooded communities in their restoration priorities. During the reconnect

process, a crew or service representative went house-to-house in hard hit areas. National Grid provided dedicated line crews and service representatives to assist customers.

Despite extensive damage and significant challenges, the electric utilities were able to restore customers at a reasonable rate. Con Edison restored approximately 95% of its 143,000 customers affected by the storm on August 31. Full restoration to all customers affected in New York City and Westchester was completed within four days (September 1) and six days (September 3), respectively. Irene affected approximately 56,000 customers in Orange and Rockland's territory. The Company restored 99% by the evening of September 2, or within five days. The remaining customers were restored by September 4.

By the late evening of September 1, National Grid was able to restore 99% of its 156,499 customers affected by the storm. Three days later, National Grid's Amsterdam area was impacted by a tornado and severe thunderstorms resulting in approximately 30,000 outages. Full restoration of these customers was completed by the morning of September 6.

Central Hudson restored all but approximately 3,000 customers within seven days (September 4) when thunderstorms caused additional outages in Ulster County, increasing the total customer outage count to approximately 15,000. Many of the circuits restored by Central Hudson were re-interrupted by the thunderstorms. The Company sought to restore service to customers who had experienced the longest outages from Irene. In several cases power had to be re-established on upstream lines to supply some of the customers that had been without power for a week.

Approximately 131,000 customers in NYSEG's service territory were affected by the storm. By the evening of September 2, 98% of customers were restored. The remaining 2% of the customers, located in the Brewster and Oneonta

Divisions, were restored by September 5, resulting in a total outage duration of eight days.

As discussed earlier, the restoration strategy should be targeted at restoring service to the largest number of customers in the least amount of time. NYSEG's rate of restoration, however, was more gradual than would normally be expected. A summary of NYSEG's outages by division and crews working in each division is provided in Table 8. Crew deployment on Sunday was based on weather forecasts and expected levels of damages. Based on weather reports and anticipated damage, over 30% of total available crews were staged in the Mechanicville Division. The Mechanicville Division, however, experienced fewer service outages than the Binghamton Division but used significantly more crews in its restoration. Most of the crews worked in the division until Monday, August 29 when outages dropped below 1,900 customers or 1.5% of system wide outages. While NYSEG redeployed some internal crews a sizable workforce continued to work in the Mechanicville Division Tuesday morning until fewer than 500 customers remained without power. Crews were also prepositioned in the Liberty Division. The division had 18.9% of available crews however only accounted for 13,754 (11.6%) of outages within NYSEG's service territory. Like the Mechanicville Division, they retained most of the contractor crews until Tuesday. Conversely, the Brewster Divisions, which had more than 70% of its customers interrupted, did not receive additional support until Thursday, September 1.

Table 8: NYSEG Outages and Crewing by Division

	Sun, August 28 at 7 pm Crews Prestaged			Mon, August 29 at 11 am Restoration			Tues, August 30 at 11 am Restoration			Wed, August 31 at 11 am Restoration		
	Outages	Other Crews	Total Crews	Outages	Other Crews	Total Crews	Outages	Other Crews	Total Crews	Outages	Other Crews	Total Crews
Binghamton	6,998	0%	3%	4,787	0%	7%	2,396	0%	7%	855	0%	5%
Brewster	54,111	43%	34%	58,458	45%	30%	40,706	45%	29%	26,050	27%	25%
Liberty	13,754	22%	19%	15,076	22%	16%	7,442	22%	18%	3,557	16%	16%
Mechanicville	4,701	35%	28%	1,900	33%	15%	322	33%	14%	Restored		
Oneonta	27,628	0%	10%	29,777	0%	17%	27,438	0%	17%	19,087	36%	29%
Plattsburgh	11,175	0%	6%	17,227	0%	15%	11,026	0%	14%	4,900	21%	21%

Staff has previously identified NYSEG crewing issues and believes this is not an isolated occurrence. While a sufficient supply of line crews was not available during Irene, the Company's organization of crews between Divisions could have been more effective. In response to Staff's interrogatory requests, the Company stated that bridge closures and roads blocked by fallen trees were significant obstructions to restoration. We understand how travel conditions can delay restoration efforts, but such conditions should be expected and addressed by established procedures. System repairs should be made in an orderly and expeditious manner. Preferably, utilities should restore customers as quickly as possible and distribute crews among communities or circuits based on the number of customers experiencing outages.

Recommendation:	NYSEG should examine its Company as a whole to establish an optimal crew deployment to achieve restoration for the largest number of customers in the least amount of time.
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ESTIMATED TIME OF RESTORATION (ETR)

Estimated times of restoration are critical for consumers and emergency support personnel for them to be able to plan properly for the care and protection of people and property. For many customers who went without power, the most common complaint heard was a lack of reliable information about how long their outage would last. Many customers said they would rather hear that their electricity would be off for

a week than be left wondering. Issuing timely restoration estimates, coupled with frequent communications, allows customers to plan alternative accommodations and make adequate arrangements in the case of a protracted outage. The utilities' ability to deliver timely and accurate information to customers and key stakeholders following a major outage is critical. Delays in providing estimates or providing inaccurate restoration information increases customer frustration and does little to assure customers that the electric company is doing all that it can to restore power as soon as possible.

There are three types of ETRs provided by the utilities following a large storm: global, regional, and local (municipal). Global estimates are broad projections that indicate the overall extent of damages to allow customers to make decisions. The electric utilities are expected to refine their ETRs as restoration progresses using current information. By providing ETRs for smaller geographic areas, the companies can increase the accuracy of the information they present to customers. The ETRs are developed using information obtained from the companies' outage management systems and are intended to indicate when the majority of customers within an area will be restored. The input variables that make up an ETR are similar for all companies and they include weather forecasts, the type and category of the storm, the severity of damage incurred, crew availability, the number of circuits locked out, the number of customers without electric service, and the number of trouble cases predicted after the storm has passed. In the case of small storms, pre-determined variables and set formulas are usually used. For major events, however, utilities must have protocols to extrapolate preliminary damage assessment information and crews to support the timely development of ETR projections.

To be informative, the ETRs must be timely, accurate, and made widely available through customer representatives, Interactive voice response systems, websites, and press releases. In 2009, a collaborative process involving Staff and the

utilities established guidelines for the information that should be provided in response to storms, or storm-like electric emergencies, and the timeline for when the information should be available to customers.²² The established guidelines were based on historic performances and they have been incorporated into each utility's emergency plans. For events expected to have sizeable outages over two days, utilities are expected to provide ETRs, where known, on a general geographic basis within 24 hours; by county within 36 hours; and for each locality affected within 48 hours, if the outages are not expected to last more than one week.

In general, all of the investor-owned electric utilities reasonably established and reported global ETRs. Because the tail end of Hurricane Irene had passed over the southern part of New York late Sunday afternoon, August 28, Con Edison and Orange and Rockland were able to establish global ETRs that evening. From the mid-Hudson Valley to the northern part of New York, strong wind gusts continued to cause additional customer outages and this delayed the ETR process. National Grid established its global ETR late Monday, August 29. Central Hudson and NYSEG needed additional time to access damage in their territories due to considerable flooding and damage to roads and bridges. Central Hudson and NYSEG published a global ETR for Hurricane Irene on Tuesday, August 30 at 7:00 a.m. and 11:00 p.m., respectively.

Table 9 below summarizes when the regional ETRs were issued. Given the variability in damage sustained, and large amount of service territory affected by Irene, the use of regional ETRs was particularly beneficial in this instance. Con Edison was quick to issue regional ETRs showing that New York City would be restored by August 30 at 11:59 p.m., two days earlier than Westchester's ETR. This is a clear example of how issuing a regional ETR with a different time than the global ETR allows customers to make appropriate plans, which may be different than if just a global ETR existed.

²² The Department's report following the December 2008 Ice Storm recommended the collaborative session as a means to ensure that the public is information in a timely manner (Case 09-E-0272).

Table 9: Regional Estimated Times of Restoration

Company	Region	Date and Time Reported	Projected ETR (90% of Customers)
Con Edison	New York City	Aug 28 6:35 pm	Aug 30 11:59 pm
	Westchester	Aug 28 8:00 pm	Sept 1 11:59 pm
National Grid	Troy	Aug 29 3:00 pm	Aug 30 6:00 pm
	Hudson	Aug 29 10:30 pm	Aug 31 Noon
	Saratoga	Aug 29 10:30 pm	Aug 31 Noon
	Albany, Glens Falls, Gloversville, Northville, Ticonderoga, Schenectady, Cobleskill, and Warrensburg	Aug 29 10:30 pm	Sept 1 11:00 pm
Central Hudson	Fishkill District	Aug 30 8:00 am	Aug 30
	Columbia, Dutchess, Orange, and Putnam Counties	Aug 30 12:30 pm	Aug 31
	Ulster and Greene Counties	Aug 30 4:30 pm	Sept 4
NYSEG	Binghamton	Aug 31 7:00 am	Sept 1 Midnight
	Oneonta	Aug 31 12:30 pm	Sept 2 (75%)
	Brewster	Aug 31 3:00 pm	Sept 2 (75%); Sept 7 All
	Liberty	Aug 31 3:00 pm	Sept 2; Sept 3 All
	Plattsburgh	Aug 31 3:00 pm	Sept 2 Midnight
Orange and Rockland	Orange County	Aug 28 9:45 pm	Sept 2 Midnight
	Rockland County	Aug 28 9:45 pm	Sept 2 Midnight
	Sullivan County	Aug 28 9:45 pm	Sept 2 Midnight

For this large-scale event, National Grid found that dividing the system into smaller, more manageable pieces made it easier to analyze. National Grid was able to publish global, regional, and several local ETRs on Monday afternoon and night, August 29. Local ETRs were completed by 7:00 a.m. on Tuesday, August 30 and were refined as needed during the restoration. In flooded areas, such as Amsterdam, Middleburgh, Schoharie, and the Stockade, ETRs were projected based on the known information. The Company clearly explained that, in the future, more detailed ETRs would be provided when it had better access.

ETRs were issued for most regions in Central Hudson's territory by 4:30 p.m. on Tuesday, August 30. Columbia, Dutchess, Orange, and Putnam Counties, which received moderate damage, were given estimates of Wednesday, August 31. The next day, Albany, Greene, Sullivan, and Ulster Counties were issued ETRs of Sunday, September 4. Essentially, ETRs remained unchanged as Central Hudson's restoration was progressing as expected. ETRs for municipalities in the hardest hit areas of Ulster County were modified on Sunday, September 4. In these cases the Company called customers during the day to inform them that their service would not be restored by the target ETR.

While Central Hudson, Con Edison, and National Grid provided timely ETRs, NYSEG's and Orange and Rockland's performance could have been better. In addition to the difficulties it experienced in gaining access to some of the most heavily damaged areas, NYSEG also had difficulties in quickly acquiring crews, which also delayed its establishment regional ETRs. The Company calculated and reported ETRs for Binghamton, Brewster, Liberty, and Plattsburgh on Tuesday, August 30. An ETR for the Oneonta Division was issued on August 31. NYSEG updated its ETRs when the crew levels were increased by over 20% between Thursday, September 1 and Friday, September 2. In instances where the damage does not follow division or municipal lines, NYSEG should consider using alternative boundaries. For example, breaking the Oneonta Division into smaller sections, and providing defined information for each section, would provide more customers with the information they need to make their plans.

The ETR for the Brewster Division changed multiple times. NYSEG issued its first ETRs for the Brewster Division on Tuesday, August 30, stating that 90% of customers would be restored on Friday, September 2. On Wednesday, August 31, the Company revised the ETR to 75% to be restored on September 2 with the remaining to be restored by Sunday, September 7. Dividing the Division into smaller, more

understandable, pieces, such as northern and southern sections of each county, may have allowed for several different estimates that would have more useful for customers. Refining and improving ETRs as needed during the service restoration is a good practice, supplying less information than a previous ETR does not suffice.

Refining and updating the local ETRs was a challenge as restoration progressed. Most of the companies did a good job in publishing local ETRs on their websites, as well as communicating this information to their customers in a timely manner. Orange and Rockland issued ETRs on a county basis early in the event. The Company then, however, issued the same ETR for consecutive periods throughout the restoration. Local ETRs reflected the same times as their respective county ETRs, indicating that the Company did not perform as complete of an analysis to determine the most accurate ETRs possible. To better serve its customers, Orange and Rockland and NYSEG should provide more refined estimated restoration times at the regional and local levels.

Recommendation:	As the restoration progresses, Orange and Rockland and NYSEG should to provide ETRs that are different from the global projection for regional sections of their territories, which may be smaller than their divisions, and continue to refine the ETRs until all localities have their own ETRs. Existing protocols should be revised to reflect these expectations and provided to Staff.
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LIFE SUPPORT EQUIPMENT AND CRITICAL CARE CUSTOMERS

To ensure safety, customers with life support equipment (LSE) and those in medical hardship status, including Elderly, Blind and Disabled (EBD) customers, need to be informed of pending weather threats, so that protective measures can be taken. Under 16NYCRR §105.4(b)(9), the electric utilities' Emergency Plans are required to contain procedures for contacting at risk customers within the first 24 hours of a pending emergency event. The utilities must have policies in place to respond to their

needs. Similarly, the electric utilities are required to contact critical care customers, such as hospitals and nursing homes. Table 10 shows the number of at risk customers who were affected by the event, and the LSE customers who were referred for field visits or to a third party for follow through contact assistance.

Table 10: At Risk Customers affected by Hurricane Irene

Company	LSE Customers Affected	LSE Referrals for Follow-up contact	EBD Customers Affected	Critical Care Facilities Affected
Central Hudson	189	36	1,484	5
Con Edison	67	35	265	16
National Grid	956	6	21,088	528
NYSEG	337	0	13,000	31
Orange and Rockland	273	11	14,150	82

After the February/March 2010 storms, we learned that when LSE customers were unreachable by phone, some companies did not always confirm that these customers were actually contacted by emergency personnel to perform a home visit. As a result, we recommended that the utilities develop procedures, using a collaborative process with Staff, to ensure that LSE customers receive proper communications during emergencies. The procedures that were developed were the result of several months of work with the utilities to identify and implement best practices. In this instance, some utilities had difficulty getting feedback from first responders, perhaps due to the scale and severity of the storm prevented these agencies from providing the expected follow up. As a result, we find that the utilities need to strengthen these follow up procedures.

<p>Recommendation: All electric utilities should continue to work with referral entities to strengthen follow-up processes and to ensure that feedback regarding LSE customers that have been referred for contact assistance are obtained and recorded.</p>

Consistent with the procedures contained in their respective Emergency Plans, all the electric utilities made pre-storm outbound calls to notify at risk and critical care customers of the pending weather threat and they made daily calls to these customers throughout the duration of the event. Staff's review of utilities' reports indicates that the utilities maintained contact with the affected critical care facilities, provided them with service status updates, monitored the status of emergency generation facilities, and addressed any facility specific needs. For example, Con Edison provided all three critical care facilities affected in its territory with emergency generators and maintained them on a standby mode until service was restored. Overall, in view of the significant damage caused to infrastructure and customer services by Hurricane Irene, the utilities' outreach efforts to LSE, critical care, and EBD customers, and the assistance given to critical care facilities was reasonable.

DRY ICE DISTRIBUTION

Electric utilities are required by 16NYCRR §105.4(b)(9) to secure and distribute dry ice for an emergency projected to last more than 48 hours. The respective emergency plans require that customers be made aware of the availability, dates, hours, and amounts of dry ice being distributed. The electric utilities' records indicated that dry ice was in short supply due to high demands from all areas affected along the East Coast, as well as service outages impacting a major dry ice producer. As a result, utilities experienced substantial delays in getting deliveries of dry ice from their contracted vendors. Most of the dry ice supply shortages were experienced during the first two days of the event, Sunday, August 28th and Monday August 29th. Many utilities distributed wet ice and bottled water to customers when dry ice was in short supply.

The electric utilities provided dry ice distribution locations and times to customers using press releases, local media, municipal officials, websites, and social

media (Twitter and Facebook). Several utilities observed that, due to the shortages, some customers sought out dry ice from neighboring utilities. At one point, NYSEG published a notice on its website stating that recipients did not need to be NYSEG customers to receive dry ice. Con Edison reported seeing cars with Connecticut plates at its distribution locations. Staff received anecdotal reports that non-customers were turned away at some locations.

At times during the first few days, customers had to wait several hours for the arrival of dry ice at distribution locations. Dry ice was more widely available during the remainder of the event. During Irene, Central Hudson distributed 75,000 pounds of dry ice at 6 locations; Con Edison distributed 84,000 pounds of dry ice at 3 locations; National Grid distributed 64,920 pounds of dry ice at 9 locations; NYSEG distributed 704,000 pounds of dry ice and 75,000 gallons of bottled water; and Orange and Rockland distributed 90,000 pounds of dry ice at 11 locations.

Overall, despite the dry ice supply issues experienced during the first two days of the event, Staff is satisfied with utilities' efforts to provide dry ice during the remainder of the event. As a result of the supply issues that were experienced in this instance, utilities should review dry ice procurement procedures to ensure that sufficient quantities are made available, and should consider securing dry ice suppliers that are located further inland.

Recommendation:	To ensure better availability of dry ice in future events, all electric utilities should review their procurement procedures and identify additional contractors, further inland, who can provide dry ice in the event of a storm impacting the East Coast.
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UTILITY REPORTING DURING IRENE

During an emergency event, the Department receives periodic updates from electric utilities, typically submitted four times daily. In addition to providing outage counts, the reports address the areas affected, make-safe and restoration activities, damage assessment, and estimated times of restoration at the global, regional or local level. The reporting structure is a well established process. The electric utilities understand the reporting requirements and the defined reporting times, recognizing they may change when circumstances warrant. Refinements to the requirements are continuously made to ensure we receive adequate information. The information we receive is loaded into our Electric Outage Reporting System which allows us to summarize the data for all companies. Additionally, Staff can produce maps showing the impact of the outage, its geographic extent, the most affected communities, and estimated recovery times.

During this event, all of the investor-owned utilities reported the required information in a timely manner. We also exchanged phone calls with the utilities for updated information on make-safe activities and restoration throughout this event. The utilities contacted us when new events transpired, keeping us abreast of the latest developments. This, in turn, allowed us to keep all involved parties properly informed. National Grid, NYSEG, and Central Hudson defined trouble areas well and kept us informed on their progress. Con Edison and Orange and Rockland's reports, while they provided the information required, did not offer additional insight on their reaction to the storm. The need for such information was discussed with the utilities in a November 2011 meeting and the utilities agreed to provide better information going forward.

Recommendation:	All electric utilities should provide comprehensive reports that discuss all aspects of the restoration when required to submit storm updates.
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ELECTRIC OPERATIONS DURING LEE

SUMMARY OF ELECTRIC SERVICE INTERRUPTIONS

Tropical Storm Lee's impact on New York State differs from Irene's the week before. While winds were not an issue, Lee brought rains that lasted for several days, which added to the already saturated grounds and swollen rivers from Irene. As a result, the electric utilities were affected primarily by flooding and the overall amount of damage to the electric infrastructure was not as widespread as that experienced from Irene. Flooding from Lee was most notable in communities along the Susquehanna and Chenango Rivers, including Binghamton and Owego, and in communities along the Mohawk River, including Amsterdam and Rotterdam Junction. NYSEG and National Grid were the only electric utilities significantly impacted by Lee, thus, our investigation and report focuses on these companies. For these companies combined, Lee caused a total of 68,000 electric customers to lose service.

Nine substations in the Binghamton Division and one substation in the Oneonta Division were flooded.²³ Despite making alterations to raise equipment in some substations following a flooding event in 2006, the water levels following Lee were so severe that NYSEG proactively shut down six substations to protect the equipment from experiencing fault conditions. Staff visited four of the flooded substations between September 11 and September 14. During the visits to the substations, we observed flooding and devastating damages to equipment. At the Goudey Substation control units, transformers, and reclosers were damaged. Water levels reached as high as 11 feet at the Castle Garden Substation destroying all of the control units. The control house at the Lower Owego Substation was completely submerged in water. Transformers were completely submerged in 12.5 feet of water at the Lounsberry

²³ Substations flooded in NYSEG's Binghamton Division include: Lounsberry, Castle Gardens, Goudey 115, Goudey 34, Owego Lower, South Owego, Apalachin, Bodle Hill Tap, and Bodle Hill. The Sidney Street Railroad substation was also flooded in the Oneonta Division.

Substation. At its peak, NYSEG had approximately 21,000 customer outages due to Lee. The Binghamton area began to experience significant outages in the early morning hours of September 7 which peaked on September 9, with 19,750 customer outages. The number of customer outages remained at over 10,000 until September 12. The Oneonta Division was affected to a lesser extent with an initial peak of 2,865 customers at midnight on September 7.

The rains from Lee caused the Mohawk River to rise above its normal levels, breaching a canal at Lock 10 in Amsterdam. The high waters resulted in the flooding of National Grid's Amsterdam substation and adjacent transmission and distribution rights-of-way. Erosion along the river banks also caused one of National Grid's transmission towers to collapse into the Mohawk. While the transmission system was stabilized, the collapse resulted in approximately 24,000 electric customer interruptions.

RESTORATION OF NEW YORK STATE ELECTRIC AND GAS CUSTOMERS

Many of the steps taken for storm preparation, damage assessment, and wire guarding were performed as it had been done for Irene but on a smaller scale. Several of the lessons learned following the 2006 event helped NYSEG to respond to Lee. For example, NYSEG left lines used to connect portable substations in place at vulnerable substations to allow for quicker restoration. Also, anticipating that the Binghamton Service Center could experience flooding as it had previously, NYSEG moved its vehicles, equipment, and materials to a vacant car dealership across the street from the Binghamton Service Center. The parking lot on higher ground was also used to stage mutual aid vehicles.

Damage assessors had to wait for waters to recede, delaying the completion of a detailed damage assessment. NYSEG made observations and collected data using helicopters for areas that were inaccessible by ground. The helicopters were

took aerial images that NYSEG's mapping group overlaid on distribution circuit maps. These superimposed images were valuable for NYSEG's restoration plan. We believe that customers would also benefit from having access to the superimposed images displayed on outage maps. The images would illustrate for customers the scale of damage to the electric system and help to satisfy their need for restoration information pending other damage assessments.

Floodwaters rose slowly and were even slower to recede, causing service outages to persist for an extended period of time. Similar to Irene, flooding and inaccessibility presented challenges for restoration efforts. Where possible, NYSEG isolated sections of line normally served by the affected substations and restored customers using field ties. To minimize restoration times, the Company pre-positioned two mobile substations for use at the Lounsberry and Castle Gardens substations to re-establish service to customers.²⁴

During the restoration period, NYSEG used re-entry teams to disconnect individual electric and gas services in flooded areas. The re-entry teams were assembled from electric and gas personnel with the skill sets required to restore service. Their skill sets allowed the team members to perform tasks that included changing out meters, making repairs, and re-energizing service. With crews possessing electric and gas skill sets working together, restorations occurred quicker. This team approach also eliminated unnecessary coordination and communication between electric and gas service groups. The re-entry teams also worked closely with building inspectors and code officials. The following re-entry teams established by NYSEG during the Lee storm included:

- An electric or gas supervisor who supervised and coordinated the re-entry team.

²⁴ Following the 2006 flooding event, NYSEG constructed lines on higher ground so a mobile substation could be installed to accelerate the restoration of the customers served by the Lounsberry substation. These lines were kept in place which allowed NYSEG to easily install a mobile substation during this event.

- Gas fitters who performed leak surveys and turned off of gas services, gas meters, and appliances.
- Line crews who de-energize distribution lines, took transformers off line, patrolled lines for damage, and make any repairs.
- Meter readers and field customer service representatives who turned off gas and electric meters impacted by the flood.
- Meter techs who recorded the electric meters that were shut off.

NYSEG started with six re-entry teams on September 11. Between September 12 and September 15, the Company increased the number to 12 re-entry teams. Re-entry work was completed by 10 teams on September 16. In summary, all but 119 customers were restored in the Oneonta Division when the Sidney Street Railroad substation was reached and reconnected on September 11. Electric service was restored to all but 1,000 customers who were able to receive service as of September 14. The last of these customers was restored on September 16. Homes where customer-owned facilities were unsafe remained disconnected. Priority was given to reconnecting these customers after they informed NYSEG that the required repairs were completed. While most customers have been reconnected, there are still locations where customers have not performed the requisite repairs.

RESTORATION OF NATIONAL GRID CUSTOMERS

National Grid's Amsterdam substation and the adjacent transmission and distribution rights-of-way had experienced varying levels of flooding with the arrival of Hurricane Irene. Saturation and erosion of the banks of the Mohawk River left the substation damaged beyond repair. National Grid installed a mobile substation to restore customers normally served by the Amsterdam substation. At this time, preliminary engineering work is in progress to build a new substation in the area.

Erosion along the river banks also caused one of National Grid's transmission towers to collapse into the Mohawk River on September 10. The

transmission system was stabilized and switching portions of the distribution system to alternate sources allowed service to be restored to most of the 24,000 customers affected during the day. All customers were restored later that night once the fallen tower and associated transmission lines were removed from the river. The Company had to rebuild the transmission line using a helicopter to run a rope across the river. The repair was completed on September 13. This solution is temporary, however, as the new conductor does not provide the required clearances over the river. We are monitoring National Grid's plans to design and construct new facilities in the Amsterdam area in the upcoming year.

UTILITY REPORTING DURING LEE

As discussed in our review of Irene, we have an established reporting protocol during an emergency. During Tropical Storm Lee, NYSEG was the only utility that experienced a large number of customer outages over a significant amount of time and, thus, was the only utility required to provide reports to the Department. Over the course of nine days, the Company submitted fourteen reports to the Department providing details on damage, restoration, and trouble areas. National Grid provided routine updates, both written and by telephone, to Staff regarding the localized event near Amsterdam. NYSEG's and National Grid's reporting following Lee was timely and adequate.

GAS OPERATIONS

RESTORATION OF GAS SERVICES DURING IRENE AND LEE

Unlike the electric distribution system, natural gas systems are not directly impacted by the strong winds that accompany hurricanes and tropical storms. Strong winds affect the natural gas system indirectly by disrupting the electric and communication services necessary for the remote operation of a natural gas system. The main impact that hurricanes and tropical storms have on natural gas systems is their flooding and the subsequent wash-outs that expose or damage natural gas pipelines.

Approximately 1,300 customers lost gas service as a direct result of washouts and flooding events of Hurricane Irene. These outages were spread across all the gas companies operating in eastern New York (Con Edison, Orange and Rockland, Central Hudson, NYSEG, and National Grid). Only two companies, NYSEG and National Grid, were affected by Tropical Storm Lee. Washouts and flooding from Lee caused approximately 11,500 customers outages with NYSEG having approximately 11,000 of those outages.

In anticipation of flooding, the local distribution companies (LDCs) shut-off gas distribution mains and customer service meters in the areas where flooding, as determined by local officials, is most likely to occur. Such action limits and prevents natural gas from entering into flooded buildings. Provided there is no damage to the distribution system, the restoration of gas service can occur as soon as flooding subsides and the customer has at least one natural gas-fired piece of equipment in operational condition. In addition to pre-emptive shut-offs, there was the flooding of buildings throughout the event that caused many of the natural gas outages and contributed the most fluctuation in outage numbers.

One of the most notable issues affecting the gas distribution system was when the bridge where New York State Route 103 crosses the Mohawk River collapsed

due to flood waters compromising the single feed into the Town of Rotterdam Junction. Given the timeframe to construct new facilities, National Grid opted to bring in a temporary portable Liquidified Natural Gas (LNG) facility to restore service to the town. While Staff believes the use of the LNG facility met the exempting criteria of 49 CFR §193.2019, “for service maintenance during gas pipeline systems repair/alteration,” and consequently under 16 NYCRR Part 259, questions were raised as to whether or not the mobile LNG facility actually met the temporary nature of that exemption or if it would need to meet siting requirements. Because the Department of Environmental Conservation (DEC) has the authority to issue regulations concerning the siting of LNG facilities and there is currently a moratorium on these facilities in New York State, National Grid felt that it was necessary to seek DEC and the Executive Office's approval for the use of temporary portable LNG facility. Approval was obtained and the mobile LNG facility was placed into operation about one week after the bridge collapse and service was restored to all customers in Rotterdam Junction capable of accepting gas service by the next day. The unit remained in service until the newly constructed crossing was placed in service on December 2.

After flood waters recede and local building code official certifies the building can be re-inhabited, there must be at least one natural gas-fired appliance in good working order for the LDC to restore service. Some LDCs formed re-entry teams with building code officials, electric personnel and gas relight crews that function well for the timely and safe restoration of both electric and gas services. Staff supports the formation of such teams as a best practice for use in to similar future events. The relights were performed in a timely manner by all the companies. Staff is satisfied with the level of resources devoted to restoring natural gas service.

UTILITY REPORTING DURING EVENT

Outage reporting for gas facilities during this event was difficult. Isolated flooding made it difficult to obtain accurate outage numbers in a timely manner. All LDCs devoted a significant amount of manpower in the field to respond to the outages as they occurred. Staff closely monitored the field activity during the event and generally found that the companies were responsive and acted to ensure safe operations in their respective service territories. The LDCs do not have an automated outage system for tracking natural gas outages in real time. The LDCs did, however, have sufficient manpower in their storm response centers to track outages by manually reviewing the end of shift reports provided from the field.

There was good communications and coordination at the field level between company forces and Staff and within company forces that greatly contributed to timely restoration efforts. There was poor communication, however, between LDCs and Staff at storm response centers. Better reporting protocols should be established at the storm response centers to ensure that the Department is kept informed during an emergency. Staff and LDCs will implement improvements during the normal review process for LDC Emergency Plans.

Recommendation:	All gas LDCs should develop better reporting protocols to ensure that the Department is kept informed during emergencies.
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TELECOMMUNICATIONS SERVICES

The evolution in telecommunications services and providers over the past decade has been substantial. Today, most New Yorkers have options for their voice, data and video services among the many telecommunications providers operating in the state over both wired and wireless networks. Since 2004, the market has seen a tremendous shift in services provided by traditional wired telephone to services provided by cable companies and wireless carriers.²⁵ Emergency responders are increasingly using alternative phone services as their primary means of communications in their day-to-day operations, and during emergency events. Staff is aware of this service preference due to the large number of county-level and emergency responder requests for cable and wireless communications assistance during the storm events. Cable and wireless phone services are not regulated by the Commission or other state agency.

Forty incumbent local exchange carriers provide regulated phone service in New York. These companies are among the oldest in the state's telecommunications industry, with several, including Germantown Telephone and Pattersonville Telephone, having served New Yorkers for over 100 years. Verizon and Frontier are the two largest incumbent providers, collectively serving approximately 5.4 million (or 97%) of the incumbent wireline telephone customers, including much of area affected by the storms. In addition, several dozen competitive local exchange carriers serve over 1.5 million residential and business lines in various parts of the state.

Twenty-eight cable companies provide video service in New York to approximately 5.4 million customer premises. Collectively, they provide cable modem

²⁵ Today there are fewer than 5.1 million incumbent access lines in service, less than half of what it was in 2004. In that time, cable provided Voice-over-Internet-Protocol (VoIP) service has grown to serve over 3 million homes, while wireless subscriptions have increased from 10.8 million to over 19 million.

high-speed data to over 4 million locations, and VoIP phone to more than 3 million homes and businesses. Two cable companies, Cablevision Systems Corporation (Cablevision) and Time Warner Cable (Time Warner), collectively serve over 4.7 million (about 88%) of New York's current cable subscribers. Both companies provide "Triple Play" services (telephone, television, and internet access) throughout most of their service territories. Cablevision primarily serves Long Island, Metro NYC and the Lower Hudson Valley region, while Time Warner has a larger geographic service footprint, and primarily serves Metro NYC, Hudson Valley, Southern Tier, Central, Western and Upstate New York regions. Twenty-six smaller cable companies serve approximately 621,000 (about 12%) of active cable customers.

Four national wireless companies, AT&T, Sprint Nextel, T-Mobile, and Verizon Wireless, provide service in New York. Their network coverage varies but, on a collective basis, the four carriers essentially cover all of New York's metropolitan and urban areas, and most of its suburban and rural areas. There are, however, many areas of the state that remain unserved or underserved by wireless companies, including portions of the Adirondack and Catskill regions, as well as parts of the Southern Tier, Central and Lower Hudson Valley. Based on the number of cellular devices in service, we estimate that nearly all of the state's 19.5 million residents are subscribed to wireless services. Although most consumers use both wireline and wireless services, wireless phone services are a primary means of communications during emergencies. Wireless services, including voice, data, video streaming and texting, are not regulated by the Public Service Commission.

TELECOMMUNICATIONS SERVICES AFFECTED

Hurricane Irene and Tropical Storm Lee tested the resiliency of the telecommunications networks in three ways: the loss of electric service to critical facilities and telecommunications equipment located in nearly one million households;

severely damaged telecommunications cables from winds, felled trees, and broke limbs; and, extensive flooding and water damage to telecommunications buildings and other facilities, including underground equipment and cables. Combined, these three conditions resulted in hundreds of thousands of individual telephone, cable television and wireless customer service impairments. Additionally, failures in the networks of secondary and tertiary telecommunications service providers (both cable and telephone) resulted in cascading outages to wireless networks through interrupted backhaul connectivity and the loss of transport circuits to competitive local exchange, cable and VoIP companies. This resulted in the loss of service to customers served by non-facilities-based providers, wireless carriers, and VoIP companies.²⁶

Network infrastructure damage and impairments to AT&T, Cablevision, Comcast, Frontier Communications, Mid-Hudson Cable, Middleburgh Telephone, Pattersonville Telephone, Sprint Nextel, Time Warner, and Verizon were among the most severe. Back-up power systems at the major cellular, telephone, and cable television network facilities kept equipment operational where electric service was initially interrupted (to the extent those locations were not otherwise flooded or physically impaired). Some facilities, such as remote terminals, fiber optic nodes, and some cellular antenna sites, that had no back-up power systems in place or accessible, lost service and remained out-of-service until portable power was deployed or electric service was restored. During the storms and subsequent recovery, network failures included the loss of dialtone, E911, Internet, data, texting, and video services. There were also instances where outages occurred when tree trimming crews cut through active telecommunications distribution cables to free or remove trees and limbs. This preventable cable damage went unreported to the telecommunications companies and resulted in service outages in areas that had previously been operational and cleared by

²⁶ Some companies, such as XChange, Vonage, and Google Talk, use the cables and electronics of other providers to deliver service to their customer base.

the telecommunications companies. Improved contact and coordination between work crews and telecommunications providers would prevent some unnecessary outages and damage to telecommunication facilities.

Based on wireline and cable company information provided during the recovery, we estimated that approximately 735,000 customer premises were out of service. Staff's post-storm review indicates that the aggregate number of customers affected was over 900,000, though the total outages at any given time may not have reached this figure. Although many telecommunications services had been restored following Irene, the de-energization of electric substations during Lee renewed service interruptions to cable, telephone and wireless network facilities in the Southern Tier for many additional days. With the storms' severe and widespread damage to cables and individual drop wires at business and residential locations, the service impact on the telecommunication networks was present long after power was restored in some areas.

The four national wireless companies generally indicated that most of their cell sites and towers across the State remained operational throughout the storms.²⁷ The overall impact of the storms on wireless networks and customers was the most difficult of the three telecommunications segments to assess. Nonetheless, we know there were times when wireless service was severely impacted or completely out of service, and when combined with wireline service loss in certain localized areas, the lack of communication became a crisis. Based upon the data provided to Staff, and other sources of available information, Staff estimates that wireless impairments affected tens of thousands of customers, and likely more at various times during Irene and Lee.

Most wireless network problems resulted from power loss or from backhaul cables, i.e., those carrying signals from a cell site back to a switching office,

²⁷ Information was only provided on a statewide basis, which included areas that were not impacted by Irene and/or Lee.

being downed, damaged, or otherwise impaired, disrupting the connection of cellular facilities to the underlying wired telephone networks. Physical damage to cell towers, antennae equipment and electronics from the storms was not a large issue. In most cases, wireless companies had sufficient inventory available, and were able to quickly repair or replace their equipment, as long as they had access to the sites. Some companies reported that where wireless service was lost, unaffected adjacent cell sites and antennas helped to provide limited service availability on the periphery of impacted areas.

EMERGENCY CALLING (E911)

The ability to dial emergency services is crucial in times of emergencies. All 62 counties have one or more Public Safety Answering Points (PSAPs) to receive 911 calls and to dispatch emergency services. PSAPs generally have the ability to process traditional telephone, wireless and cable VoIP phone calls. Enhanced 911 services, like Automatic Location Identification (ALI) and/or Automatic Number Identification (ANI), provide PSAP dispatchers critical information on customer locations. Verizon provides much of the network connections and database information for landline and wireless 911 calls made within the state. Some cable companies use third party providers and alternative networks to route and distribute VoIP 911 calls to PSAPs.

During Irene and Lee, the wireline 911 network experienced varying degrees of service interruption. In some instances, the ability to complete 911 calls was impaired. In other instances, PSAP dispatchers received emergency calls without the ALI/ANI information they normally receive. Storm related damage and power outages caused circuit failures that completely disrupted the normal delivery of 911 calls to PSAPs. When these outages occurred, the calls were rerouted to administrative lines at the PSAP facilities or rerouted to alternate PSAPs, enabling customers with dial tone to reach emergency services. Where electric service outages or damaged subscriber drop

wires resulted in the loss of dial tone at residential premises, customers were unable to dial for emergency services using their wired telephone service when the 911 network was otherwise operational.

In one instance, damage to control links at a PSAP facility in Greene County isolated three central offices, preventing incoming or outgoing calls until the circuits were repaired.²⁸ At least one such outage was caused by emergency personnel who cut through active fiber optic cables and severed communications in the area. Service was restored in about 24 hours, after repair crews obtained access to the area and completed necessary repair work.

STORM PREPARATION

All telecommunications companies prepared for the storm events, usually by following processes outlined in formal emergency and business continuity plans. Their preparations varied by such factors as company size, equipment and staffing levels, the service territory covered, and past storm and recovery experiences. Storm preparation activities undertaken by Verizon, Frontier, Cablevision, Time Warner, and other wireline telephone and cable companies included: the fueling of backup generators and checking mobile generator inventories; moving assets/trucks to higher ground; sandbagging low-lying facilities; shipping additional fiber optic cable and supplies to key locations for use after the storm; by establishing advance contacts with construction and line crew contractors to be able to supplement company repair crews; placing Network Operations Centers and Staff on heightened alert; enhanced storm tracking activities; by shutting off non-essential (non-service affecting) electrical circuits; by delivering high volume water pumps to flood prone buildings; by removing and storing the bottom drawers of file cabinets, desks and other low lying documents and

²⁸ Telephone companies use Signaling System 7 (SS7) which is a set of control protocols used to set up and terminate phone calls on the public switched telephone network. Networks that become isolated from SS7 are unable to complete customer's calls.

office equipment at higher locations. The actions taken by the wireless companies included: activating employee notification systems to ensure that employees and their families were safe; fueling backup generators and checking mobile generator inventories; pre-positioning recovery resources; moving mobile assets and trucks to higher ground; placing Network Operations Centers and staff on heightened alert; disseminating consumer tips and recommendations for using wireless service before, during and after any storm; and, coordinating relief efforts with local, state and federal officials. Overall, Staff believes telecommunications company preparations for Hurricane Irene appear to have been adequate based on the storm's initial predictions.

DAMAGE ASSESSMENT

Following Hurricane Irene and Tropical Storm Lee, all telecommunications companies performed damage assessments as conditions allowed. The extent of the assessments varied by several factors, including company size, staffing levels, and the amount of service territory affected.

The initial damage assessment examines network facilities, commercial power alarms, and outage reports. At the onset of a major service outage, Verizon states that it performs an end-to-end examination of its network, beginning with the affected central offices, and then outwards to assess the conditions in the distribution plant. The central office assessment includes checking commercial power availability, the status of generators, and their affects on remote systems. Frontier indicates that its damage assessment was performed by local managers, supervisors, and field technicians. Time Warner, Cablevision, Comcast and other cable companies deployed field crews to visually inspect their facilities, including pole lines, underground cables and electronics, head-end offices, and remote sites. Situational reports were regularly updated by the field offices, and staffing levels were routinely reviewed.

Smaller service providers follow similar damage assessment practices, but on a smaller scale given their limited resources. Delhi Telephone Company, for instance, indicated that damage assessment is initially performed by reviewing its trouble reports for common root causes. Other small companies conducted ride-outs to their facilities based on incoming customer trouble calls, answering machine messages, and media reports of damage.

Middleburgh Telephone Company stated that a notable cause of telecommunication personnel delay in conducting damage assessments in its service areas was due to a large volume of people that came to the area to observe the damage caused by the storm. The additional traffic increased repair times and made working conditions hazardous for work crews. The company indicated that it was best able to complete repairs late in the day and evening, as traffic levels subsided. It also noted that better coordination between local law enforcement and traffic safety is necessary to minimize non-essential traffic in restoration areas during emergency events.

Wireless companies remotely monitor facilities to assess operational status at their network operation centers. Based on the severity of the storms, AT&T, Sprint Nextel, T-Mobile, and Verizon Wireless indicated that they deployed field crews to visually inspect their facilities. In one instance, however, Verizon Wireless did not accurately assess its network operation in the Margaretville area. Verizon only determined that service was impaired in that area after receiving multiple inquiries from Staff and emergency agencies regarding service availability. In addition to repairing an antenna problem, Verizon deployed a portable tower system to improve network coverage in that area. During the storm recovery, wireless carriers did not provide details of their staffing levels at facilities or field crew deployments. Consequently, Staff is unable to verify if wireless company damage assessment efforts were adequate or directed to the most critical areas to optimize repairs and restoration.

Following the storms, accurate damage assessments and determining impact on total trouble load were complicated by many factors. First, there was substantial damage to the wireline and cable network that served both residential and business customers, as well as other telecommunications carriers. Second, the extent of damage to the subscriber service cables (drop wires) located at the farthest end of the network was difficult to ascertain as these facilities are often located in customers' backyards, where accessibility during and after a storm for damage assessment is difficult. Another challenging factor for the companies' damage assessment following these storms was the many customers who did not report service outages right away. Wireline and cable companies rely on customer reporting to help identify and assess the extent of their storm damage. Diminished customer reporting may have been due to any of the following reasons

- The extended loss of power and excessive damage and flooding in areas that caused customers to leave their homes;
- Customers who believed that utility services would eventually be restored without their having to notify the telecommunications carrier;
- Customers who could not call in trouble reports due to power loss at their homes and some who believed that phone service would be restored concurrent with their power restoration;
- More serious problems than loss of telephone service that took priority, such as flooded basements and other property damage;
- Wireline and cable customers whose cell phones continued to work during the event, reducing their urgency for wireline service restoration.
- Rural telephone company service to seasonal customers who were not at their premises during the event, and therefore, did not report to their service providers.

Overall, the practices applied by the telecommunications companies, large and small, appear to be generally effective in identifying significant network damage incurred by the storms. Diminished outage reporting by customers is a common problem during storm events. Given this fact, telecommunications companies should

review their processes to incorporate field assessment following widespread outage events. By doing so, companies will be able to more accurately estimate the number of customer outages.

CREW LEVELS

In response to emergency events, telecommunications companies will determine the additional workforce they need by taking into account the anticipated trouble load, the required skill types, resource availability from other areas (both in and out-of-state), and such logistical challenges as lodging availability. Pursuant to their Emergency Plans, the companies, including Verizon, Frontier, and TDS, dispatched additional workforces to the impacted areas in their respective service territories to assist in the Irene and Lee recovery efforts.

Unlike the electric industry, the wireline telephone industry does not have a formal mutual assistance process. Generally, the smaller, independent telephone companies have informal protocols in place to request or render assistance to one another during emergencies and at other times of need. In addition, some of the independent companies are subsidiaries of larger organizations from whom they are able to draw additional resources as needed. As indicated by Taconic Telephone,²⁹ workers from other companies were used to help restore service and answer trouble calls. Larger national companies, like Frontier and Verizon, augment their New York work forces with personnel from unaffected areas within the State and from outside of New York.

Under normal operating conditions, Verizon would already have several thousand repair technicians working in its service areas. By August 29, Verizon had supplemented its workforce with thousands of additional technicians who were

²⁹ Taconic Telephone is a subsidiary of the Fairpoint Telecom group, which is made up of 28 companies, with three operating in New York State.

assigned to network restoration. Verizon declared a state of emergency on September 2 and throughout much of the storm recovery, Verizon technicians worked around-the-clock on multiple shift schedules. The total Verizon workforce assigned to the Irene and Lee restoration effort reached its peak with over 6,700 on September 15. While the Company's peak staffing level was sufficient, there was a concern about prematurely releasing crews, which is discussed in detail in the restoration of service section.

Delhi Telephone, Deposit Telephone, Margaretville Telephone, Middleburgh Telephone, and Pattersonville Telephone, all small incumbent service providers, augmented their work forces with additional support provided by other independent companies in New York. Some hired contractors or recalled retired employees to help expedite repairs as quickly as possible. With the exception of Verizon, we are satisfied with the level of crewing used by telephone carriers. Verizon's early termination of its state of emergency is addressed in the telecommunications restoration section of this report.

Cable companies collectively deployed over 2,400 technicians to work on restoration and recovery activities following Irene and Lee. Included in this figure are over 1,000 contract field workers acquired by the companies to help expedite the network recovery. In many cases, companies had crews working around the clock for many continuous days. Because cable service outages due to the storms appear to have been cleared for most customers in a timely manner, we are satisfied with the crew levels used by the cable companies to restore service.

The wireless companies indicated that they used additional workers for their Irene and Lee restoration until network operations returned to normal. The wireless companies, however, did not provide specific information on either the number of field technicians or network operation staff used under normal operating conditions, or the number of workforce augmentations made during the storm events. Unlike wireline telephone and cable networks, wireless networks do not serve customer

premises using drop wires, telephone poles, or distribution cables. Thus, they do not have service technicians to repair individual customers. Instead, wireless company field work activities involve technicians working at cell sites or mobile switching locations who install and maintain portable backup power equipment and repair damaged site equipment. AT&T, for instance, indicated that its Network Disaster Recovery organization includes specially trained personnel who help ensure the flow of wireless and wired communications during emergencies. They are backed by a fully staffed, centralized command and control group, at its Global Network Operations Center, that coordinates efforts for maximum effectiveness and efficiency. Due to the lack of workforce information from wireless companies, Staff was unable to determine whether storm staffing levels, forecasts, and augmentations were sufficient to safely perform network repairs as expediently as possible.

RESTORATION OF SERVICE

Telecommunications restoration strategies, and overall restoration duration, depends significantly on the unique characteristics of the storm events and the amount of advance notice received for such occurrences. Important considerations include the geographic area impacted; the concentration of damage; the elements of the telecommunication networks damaged; the types of services and number of customers affected; and available company equipment and workforce capabilities.

Responding personnel must be mindful of the hazardous conditions posed by downed electric wires, broken tree limbs, and the dangers in the environment due to rain, wind and soil erosion. The restoration of telecommunications services always lags the restoration of electric facilities, as technicians must wait for the “all clear” notice from the electric utility before entering the areas that have been damaged. In many instances, multiple telecommunications providers rely on facilities provided by another

carrier, and thus must wait until the facility owner has completed its repairs before customers on another network can be restored.

Verizon reported that hurricane winds and tropical storm flooding caused significant damage to its facilities. The initial field reports from Verizon's technicians indicated that the storm had caused numerous downed trees, broken poles, downed drop wires, low-hanging cables, and live electric lines touching telephone cables. Verizon customers experienced service outages due to damaged aerial cables, compromised underground cables,³⁰ and drop wire damage at many customer locations. During the course of the restoration, Verizon replaced, reattached, and repaired over 500 poles, 100 distribution and feeder cables, and 2,000 subscriber drop wires.

In many areas, the loss of electricity impacted dozens of Verizon network facilities, including remote offices and electronics in the field. Many of the offices had backup powering which kept services in operation. Over the course of two weeks, electric service was returned to the central offices, with the last central office restored on September 14. Where plant continuity existed between central offices and customer premises, telephone service was available even when electric service was lost.

Prior to the storms, a strike by Verizon's unionized work force during the month of August, which ended just days before Hurricane Irene hit New York, caused an elevation in the volume of customer trouble reports. As a result, Verizon had a backlog of more than 22,000 trouble reports. Hurricane Irene added significantly to the pre-existing trouble report load, which peaked three days after Irene on September 1, at almost 60,000 open reports. On September 2, Verizon declared a state of emergency in its Long Island, NYC Boroughs, Mid-state and Upstate East service territories. This allowed Verizon to reallocate resources from other regions to assist in the repairs and to pay employee overtime. New installation activity in the impacted areas was temporarily

³⁰ A considerable portion of Verizon's underground cables consist of older vintage paper-insulated type, which are more susceptible to failure from water damage and flooding than newer vintage copper and fiber optic cables.

suspended and those employees were reassigned to restoration functions. Verizon stated that a declaration of a state of emergency for field employees any earlier would have been unproductive because of the access problems that limited the number of its employees who could have been dispatched for repair activities.

Verizon was making steady progress in daily load reductions following Irene, but the severe flooding due to Tropical Storm Lee increased the trouble report load again to about 33,000 on September 10. Over the next week, the Company used peak staffing levels to reduce the trouble report count by approximately 50%. Despite seeing another rise in trouble reports in the last two weeks of September, Verizon began reducing personnel assigned to restoration efforts and terminated its emergency declaration for all service areas on September 27. Trouble reports continued to rise throughout the month of October and normal operations, in terms of trouble load, were not achieved until the first week of November. Because it took six weeks for Verizon to return to normal operations after the termination of the emergency declaration, Staff believes that reduction of available crews by Verizon was premature and resulted in a prolonged restoration in certain areas.

From August 29 to September 21, Frontier received over 12,000 customer service affecting conditions. Hundreds of drop wires had been damaged and electric service problems affected over 150 central or remote office facilities. Frontier deployed portable generators to facilities lacking backup power, or where backup batteries were depleted. The company experienced the most severe impact to its networks in the Lower Hudson Valley and Southern Tier regions of the state. In some areas, such as Goshen and Washingtonville, Orange County, Frontier dispatched additional company work forces from other states to expedite service restorations. Technicians worked around the clock to excavate, dry, replace, and re-splice thousands of cable connections to restore services.

The Irene and Lee restorations brought about an influx of state, county, and federal emergency services personnel to areas where communications difficulties were exacerbated by already limited wireless availability. In many instances, County Emergency Operations Managers requested wireless service prioritization through the State's Office of Emergency Management and the Department. In one instance, Staff assisted Margaretville Telephone and AT&T to quickly deploy an AT&T portable cell tower, known as a Cell-on-Light-Truck, or COLT on September 1. Two days later, Staff coordinated a solution between Verizon Wireless and Margaretville Telephone to deploy a Verizon Wireless COLT. With two portable cell towers deployed in the Margaretville area, wireless services for the general population and emergency services personnel was greatly enhanced. Staff also assisted with Sprint Nextel's deployment of three satellite-based COLTs in Schoharie and Greene Counties to provide much needed voice and data communications.

Telecommunications and electric services have become increasingly more codependent over the years. Thus, service restoration following a significant storm requires coordination of efforts among utilities. Staff observed that telecommunications companies' ability to coordinate their service restorations with local power utilities varied. Some companies, notably the smaller telephone companies, indicated that they had good electric utility contacts to communicate and coordinate repairs. As part of our investigation, telecommunications companies indicated that they had difficulties reaching appropriate contacts at the electric utilities. As a result, in some instances, telecommunication repairs were delayed or less efficient than they might otherwise be. Staff believes that there is a need for improved communications and between electric utilities and telecommunications companies to expedite service restoration. Staff believes that additional joint-utility meetings, such as the one facilitated by staff on November 30, 2011, should be conducted routinely to further enhance inter-company communications.

Recommendation:	Because wireless communications services are critical during emergency events, better coordination is needed between wireless and wireline providers of backhaul facilities to prioritize and expedite critical service restoration during emergencies.
	Telecommunications companies should explore means to improve communications and coordination with electric utilities for emergency response requirements.

UTILITY REPORTING DURING EVENT

Prior to Hurricane Irene's landfall in New York, Staff contacted over 30 incumbent and competitive telephone companies, cable companies, and wireless carriers to assess their preparations for the impending storms. Staff informed the companies that we had initiated our emergency response activities as outlined in the Department's outage reporting guidelines, and we asked the companies to provide brief summaries of their emergency plans and activities undertaken to prepare for the coming storm. Staff asked the companies to indicate whether their preparation activities included such action items as pre-deployment of backup power generation and anticipated fuel supplies; adequate stocks of repair parts and equipment; deployment of emergency administrative and field crew staffing; use of emergency contact lists; and having mutual aid agreements with other service providers.

Telecommunications service providers are, or should be, well aware of the Department's telecommunications outage reporting protocols. However, during Irene and Lee, Staff found it necessary to initiate contact with numerous companies to elicit their network status information when reports were not forthcoming. Repeated Staff outreach to individual companies during emergencies caused delays in assessing the status of the telecommunication networks during storm restoration.

During the Irene and Lee restorations, Frontier and Verizon, to their credit, provided regular and consistent information. They updated their network conditions

once or twice daily, both during and after normal working hours, for almost three weeks. Pertinent information from Middleburgh and Pattersonville Telephone companies was provided nearly as often. Reports from other telephone companies were less frequent.

The reports from competitive local carriers were less reliable and less consistent than those provided by the incumbent telephone companies during the Irene and Lee storm restorations. We believe the reporting deficiencies are due to frequent changes in company personnel; misunderstandings and failures to assign new representatives when personnel changes occur; representatives assigned to outage reporting who reside outside New York; and a general lack of priority accorded to outage reporting by corporate management.

In general, the outage reports from cable companies following the storms were less consistent than those provided by the incumbent telephone companies. During Irene and Lee, Time Warner's outage reports were excellent, providing regular, consistent outage information to Staff. It updated network conditions for video, voice, and data services, once to twice daily, both during and after normal working hours, for almost three weeks. Outage information provided by other cable companies was less frequent and detailed than that provided by Time Warner, particularly at the beginning of the storm event. Some cable companies did not begin reporting until after Irene had passed and the fallout from Lee was in progress. Even then, reporting only commenced upon Staff's inquiry. For instance, until Mid-Hudson Cable was contacted, Staff was unaware that severe damage occurred in parts of its network in Delaware, Greene and Columbia counties. Likewise, Comcast was late in reporting network status reports and updates until prompted by Staff. The Company then reported substantial storm impacts in Dutchess and Putnam counties, and kept Staff informed on its restoration efforts thereafter.

Network status information provided by wireless carriers to Staff during the Irene and Lee storm events varied by company and it was not always as detailed as it should have been. Staff notes that AT&T provided regular and consistent information on an almost daily basis, during and after normal working hours, for almost three weeks. In its reporting, Sprint included useful graphical information showing backhaul and power problems that were affecting its network at certain county locations. This was very useful in assessing overlapping telecommunication outages in specific areas of the state. Other wireless companies only provided overall network status information in terms of the percentage of the network that was in-service on a statewide basis. Such general information is not sufficiently detailed to allow Staff to assess localized network conditions for storm impacted areas.

Residents, businesses, emergency responders, municipal leaders, and elected officials routinely seek help from the Department when communications services, including those provided by alternative providers, are disrupted for any length of time. Delayed or geographically indistinct reporting limits our ability to accurately assess network conditions and support request from emergency responders, which usually occur at the local and county levels.³¹ Improved outage reporting by Cablevision, for example, is essential given the size of the Company's New York customer base, the range of its services, and the geographic scale of its service territory. Accurate reporting of network outage information at a granular level also benefits wireless carriers who might require assistance from the incumbent telephone companies, whose cable facilities are used for cell site backhaul or for expedited restoration of power to those sites.

³¹ The inadequacy of reporting from wireless providers during Irene challenged Staff's ability to respond in a timely manner to emergency requests from the State Office of Emergency Management, FEMA, and County Emergency Management Coordinators.

Recommendations: All telecommunications companies should work with Staff on steps necessary to improve compliance with established outage reporting guidelines; review their internal policies to ensure that outage information is reported in a timely and accurate manner; and, confirm that company representatives responsible for outage reporting are familiar with those guidelines and relevant Staff contacts.

When reporting outages, information from wireless carriers should provide more granular network impairment data to include facilities, customer impact, and specific locations (municipality and/or county basis).

SYSTEM RELIABILITY AND RESILIENCY

Following major storms, it is appropriate to examine the utility companies' efforts to minimize storm effects on customers. The two areas we consider here are capital improvements and modifications to maintenance activities.

ELECTRIC SERVICE PROVIDERS

Many of the electric utilities' infrastructure programs today focus on how to minimize the number of customers affected by storm damage as well as designs that allow customers to be restored more quickly after an interruption occurs. Sectionalizing equipment is being deployed aggressively and the newest models are more sophisticated (e.g., each phase of a three phase recloser works independently to avoid a complete loss of service downstream). Utilities also install more redundancy in the transmission and distribution of electricity to customers, including more sections of line between circuits (tie lines) for use during emergencies. Additionally, some utilities are beginning to convert their traditional radial systems into loop designs to improve reliability. Each of these efforts helps and their benefits are magnified by the use of automated equipment that performs switching functions within seconds. System designs with increased monitoring, automation, and intelligent control of the distribution system help to minimize the number of customers affected and can reduce outage durations following a major storm.

The Department and the electric utilities are also concerned about aging electric systems. Many assets used to supply power to homes across the State are more than fifty years old. Our regulations require companies to perform complete system inspections every five years and to repair any deficiencies identified within one week to three years, depending on the severity of the deficiency. In recent years, the investor-owned electric utilities have implemented replacement programs to address assets at

the end of their functional service lives. Rather than simply replacing assets with like ones, the utilities consider design improvements where customer benefits can be obtained. For example, the relocation of back yard facilities to street locations can minimize exposure to tree damage and provide easier access for repairs. In addition, new facilities are built in accordance with current, more reliable design and construction standards.

With respect to maintenance activities, vegetation management programs have been enhanced to minimize damage from tree limbs and unhealthy trees that can fall into an electric line during a storm. The investor owned utilities' combined distribution line clearance budget for 2011 was over \$88 million. All companies trim their distribution circuits on cycles; however, the length of each cycle may vary depending on the voltage class of the circuit being trimmed. All companies follow the ANSI A300 specifications that are the accepted industry standards for tree trimming practices. Trimming during routine cycles has become more aggressive to ensure that the vegetation within, and in some instances above, a clearance "box" around the electric lines is removed. Even with increased trimming, electric facilities are still affected during storms by healthy trees falling or uprooting, some of which may be outside of the utilities normal trimming zone or right of ways.

Electric utilities spend approximately \$1.9 billion each year on infrastructure investment. System design changes made to further "storm proof" the electric infrastructure will only add to this investment level. Therefore, cost-benefit analyses are necessary to ensure that the additional investments should be made. Nevertheless, service interruptions from severe storms cannot be completely avoided and will continue to occur.

Recommendation:	All electric companies should review facilities that are susceptible to outside factors, such as flooding, excessive tree damage, or limited access, to determine whether reasonable infrastructure improvement or increased maintenance could be made to reduce the customer impact of a storm or facilitate the ability of the utility to restore service.
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TELECOMMUNICATIONS SERVICE PROVIDERS

Wired and wireless telecommunications networks depend on commercial power in varying degrees to provide service. Cable networks, in particular, rely more heavily on commercial electricity to power most of the field electronics (fiber optic nodes and amplifiers) necessary to distribute telecommunication services over the broadband network. Major hub sites and many fiber optic nodes are equipped with a battery supply to help sustain network operations during an electric service disruption, which is usually limited to several hours. When battery supplies are depleted, service to customers is interrupted and remains so until power is restored. By design, traditional telephone networks are built to operate during power outages, and even supply power necessary to operate older telephones, however, they too have components in remote areas that require commercial power and fail after battery supplies run out. Wireless companies' networks are designed with most cell sites and antenna locations equipped with battery backup to sustain network operations for short durations (in the range of 2-8 hours).

In cable and telephone networks, temporary portable generators can be used to restore remote switches, fiber optic nodes, and hubs, however, in widespread outage events like Irene and Lee, there may not be enough generators available to be deployed to the many hundreds of affected locations. To their credit, a record number of portable generators were deployed by the wireless companies in response to Irene and Lee. While access to portable generator supplies was stressed by the large

geographic area impacted by these storms, AT&T was able to secure and deploy all the portable generators it needed throughout New York. There are, however, numerous challenges with portable generator deployments, including the scheduling and staffing requirements for repetitive refueling, routine maintenance, and oversight. If not maintained by technicians on a regular schedule, portable generators may fail and result in an overall service failure at a location.

Increasing the level of redundancy in the network design is another area to consider. Backhaul facilities supporting wireless service are typically provided by the incumbent or competitive facilities-based carriers (including cable companies) that serve the area where the cell site is located. Some wireless companies use microwave links for backhaul connectivity to central offices. The amount of microwave backhaul varies by company, for business and technical reasons, including capacity requirements, spectrum availability, and geographic considerations. Similarly, some portions of the cable networks have single interconnection points. Without redundancy, if the network path is interrupted for any reason, service will fail. Wireless companies generally rely on signal overlap from adjacent cell towers to mitigate service interruptions when a tower at any given location fails. In areas with few cell towers or in extreme events, this mitigation process may not be effective, and alternate forms of redundancy should be considered. Staff recognizes that geographic limitations and cost constraints may restrict the ability to construct diverse paths; however, enhancing route diversity and minimizing single points of failure will provide better service reliability.

Finally, like the electric network, the age of the telecommunication equipment and infrastructure will affect the network's resiliency. During Irene and Lee, many of the underground cables that failed were older, paper-insulated copper cables that became water damaged and shorted out. These vintage cables, many of them decades old, continue to operate under normal conditions but they are highly susceptible to failure during heavy rains or flooding conditions. Wet cable problems can

take longer to fix because of the time needed for the cable to dry and the many hundreds to thousands of individual splice repairs necessary when a cable needs to be replaced.

Recommendations:	<p>All telecommunications companies should review their network architecture plans to determine whether battery backup enhancements are necessary to improve network resiliency.</p> <p>All telecommunications companies should review their portable generator inventories, manpower levels, and refueling contracts to determine whether additional resources are necessary to expedite service restorations and prioritize equipment deployment plans. Emergency Plans should be updated accordingly.</p> <p>All telecommunications companies should review their facilities, especially those located in areas known for rainfall and/or flooding, to determine whether targeted network enhancements, in the form of cable or equipment replacements or facilities additions, would help diminish repetitive, large scale outages.</p>
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SUMMARY OF RECOMMENDATIONS

The following is a summary of the recommendations included in this report.

COMMUNICATIONS

Utility Call Centers

1. Orange and Rockland should provide to Staff a report outlining the steps it will take to improve overall call center technology and performance during storms.
2. Wireless and other phone service providers should clearly define their customer credit policies for widespread outage events and maintain records of the credits issued to New York customers in response to such events.

Media and Customer Communications

3. During and following a major storm, disaster, or other emergency, all telecommunication providers should strive to issue press releases on a regular (daily) basis and provide a more accurate picture of the number of customers being affected along with an estimated time period of restoration.
4. Central Hudson and NYSEG should report on their enhancements for the provision of ETRs and their presentation on website maps.
5. NYSEG should provide a local presence in severely impacted areas and identify alternative means to improve communication with county offices.

Communications with Public Officials

6. All utilities should extend invitations to local and state elected officials representing districts in their service territories to be included on their municipal call lists.

Alternative Communication Technologies

7. All utilities should investigate ways to continue to expand the use of newer technologies to communicate with customers during outages (i.e., email, text messaging, and social media) and report their findings to Staff.

ELECTRIC AND GAS SERVICES

Restoration

8. Orange and Rockland's emergency plan should formally incorporate the Corporate Coastal Storm Plan.
9. The electric utilities should formalize agreements with property owners to temporarily stage crews, materials, and equipment during restoration at strategic locations that would be useful for future restoration efforts.
10. Each electric company should develop procedures relating to the use of contracted damage assessors, including training requirements. Their Emergency Plans should identify when these procedures would be used.
11. National Grid and Con Edison should investigate the use of mobile data collection for damage assessment by company and contracted personnel and report their findings to Staff.
12. Each electric utility should expand its emergency plan to include procedures for obtaining crews from distant states. The emergency plans should include contact information for utilities, contractors, and mutual assistance groups and acknowledge travel and rest time restrictions before the crews can be deployed into the field.
13. All electric utilities should better define minimum staffing requirements for the number of wire guards to be used in their emergency plans. The requirements should also identify alternate staffing levels when conditions, such as a hurricane, will likely cause an increase in the number of down wires.
14. All electric utilities should modify their Emergency Plans to identify the means to obtain supplemental wire guards through contractors during or prior to an emergency when employees may not be available to serve as guards because they are needed for alternate functions.
15. All electric utilities should modify their Emergency Plans to define when it would be appropriate to use municipal field liaisons or a similar process to facilitate the removal of hazardous conditions.
16. NYSEG should examine its Company as a whole to establish an optimal crew deployment to achieve restoration for the largest number of customers in the least amount of time.
17. As the restoration progresses, Orange and Rockland and NYSEG should provide ETRs that are different from the global projection for regional sections of their territories, which may be smaller than their divisions, and continue to refine the

ETRs until all localities have their own ETRs. Existing protocols should be revised to reflect these expectations and provided to Staff.

18. All electric utilities should continue to work with referral entities to strengthen follow-up processes and to ensure that feedback regarding LSE customers that have been referred for contact assistance are obtained and recorded.
19. To ensure better availability of dry ice in future events, all electric utilities should review their procurement procedures and identify additional contractors, further inland, who can provide dry ice in the event of a storm impacting the East Coast.

Reporting

20. Guidelines for writing self-assessment reports should be developed through a collaborative process including Staff and the electric utilities to ensure future reports contain all appropriate information and provide a comprehensive discussion of key decisions and actions taken. The resulting guidelines shall apply to all electric utilities.
21. All electric utilities should provide comprehensive reports that discuss all aspects of the restoration when required to submit storm updates.
22. All gas local distribution companies (LDCs) should develop better reporting protocols to ensure that the Department is kept informed during emergencies.

System Reliability and Resiliency

23. All electric companies should review facilities that are susceptible to outside factors, such as flooding, excessive tree damage, or limited access, to determine whether reasonable infrastructure improvement or increased maintenance could be made to reduce the customer impact of a storm or facilitate the ability of the utility to restore service.

TELECOMMUNICATIONS SERVICES

Restoration

24. Because wireless communications services are critical during emergency events, better coordination is needed between wireless and wireline providers of backhaul facilities to prioritize and expedite critical service restoration during emergencies.
25. Telecommunications companies should explore means to improve communications and coordination with electric utilities for emergency response requirements.

Reporting

26. All telecommunications companies should work with Staff on steps necessary to improve compliance with established outage reporting guidelines; review their internal policies to ensure that outage information is reported in a timely and accurate manner; and, confirm that company representatives responsible for outage reporting are familiar with those guidelines and relevant Staff contacts.
27. When reporting outages, information from wireless carriers should provide more granular network impairment data to include facilities, customer impact, and specific locations (municipality and/or county basis).

System Reliability and Resiliency

28. All telecommunications companies should review their network architecture plans to determine whether battery backup enhancements are necessary to improve network resiliency.
29. All telecommunications companies should review their portable generator inventories, manpower levels, and refueling contracts to determine whether additional resources are necessary to expedite service restorations and prioritize equipment deployment plans. Emergency Plans should be updated accordingly.
30. All telecommunications companies should review their facilities, especially those located in areas known for rainfall and/or flooding, to determine whether targeted network enhancements, in the form of cable or equipment replacements or facilities additions, would help diminish repetitive, large scale outages.

STATE OF NEW YORK DEPARTMENT OF PUBLIC SERVICE



Case 11-M-0481

139 Union Road, Spring Valley
Hurricane Irene
Fatality Investigation
August 28, 2011
Orange and Rockland Utilities, Inc.

Electric Distribution Section
Office of Electric, Gas & Water
June 2012

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INTRODUCTION

On August 28, 2011, heavy rain and strong winds during Hurricane Irene resulted in a tree limb falling onto an energized wire causing the wire to fall to the ground near the corner of Union Road and Merrick Drive in Spring Valley. Tragically, two members of the public were electrocuted and a third was injured by the energized down wire owned by Orange and Rockland Utilities (Orange and Rockland or the Company). The two fatalities were identified as a young child, age six, and a man, age fifty. The injured person, age forty-three, was the father of the deceased child. A review was performed by DPS Staff to determine if Orange and Rockland had properly followed its procedures for handling energized down wires during a storm event and whether its procedures were adequate.

Staff's investigation focused on the weather conditions during the storm and the Company's response to the two emergency calls made in connection with this incident. During the discovery period, Staff interviewed Company representatives and submitted interrogatories requesting detailed information. Staff also reviewed Orange and Rockland's Hurricane Irene Report; Spring Valley Police Department (Police Department) reports; and other information regarding the Company's fatality investigation.

Upon completing its investigation Staff believes that the Company complied with its practice and procedures and that this incident was a tragic accident. In the course of its investigation, Staff observed certain areas for improvement, which although they did not contribute to or cause the accident, are the subject of recommendations for improvement by the Company and the other New York utilities.

DESCRIPTION OF INCIDENT

In the early morning of August 28, 2011, the Spring Valley Police Department responded to a call regarding a down wire in the vicinity of Union Road and Merrick Drive (incident location). Police reports indicated that the call came from an owner of a house near where the down wire fell. Several police units were dispatched to the incident location between 2:00 a.m. and 2:15 a.m. to investigate the down wire. Orange and Rockland received notification by the Police Department at 2:10 a.m. One officer clearly indicated that *"the fire was stemming from the wire"*, while another said it was *"arcing"*, a third officer stated that the wire on the ground was causing an *"electrical fire"*, and a fourth officer said that a *"transformer was on fire and wires were arcing"*. This fourth officer also said that the *"conditions were extremely poor as it was raining heavily and extremely windy"*.

While the officers were on the scene, the fire and the arcing from the wire stopped. Unsure whether the wire was energized, an officer radioed Headquarters to inquire as to the condition of the down wire; Headquarters responded that Orange and Rockland said that power was shut down in the area of where the wire was down.¹ The police officers were then instructed by their superior officer to patrol the area. The police report indicated that the patrol cars left the incident location at around 3:00 a.m.

Orange and Rockland's records showed that shortly after 3:00 a.m., a Company technician received instructions from a supervisor to go to the incident location to assess a down wire situation. The technician arrived at 3:55 a.m. and observed no police officers at the incident location. The technician observed a single phase primary line² down near the corner of Union Road and

¹ As discussed later in this report, Orange and Rockland indicated that there were power outages in the general area of the incident, but did not state that the wire was de-energized.

² A primary line is a high voltage distribution feeder rated between 4,000 volts and 34,000 volts that typically serve large blocks of customers.

Merrick Drive and determined that it was energized. The technician cordoned off the area by surrounding the energized wire with red warning tape labeled "Danger High Voltage". An orange safety cone was also positioned to hold up the red warning tape surrounding the down wire. Once the area was marked off, the technician reported his findings to his supervisor and was dispatched to a new assignment.

Later that morning, at approximately 11:00 a.m., a Police Department patrol car responded to a call regarding an explosion and possibly a man down near 138 Union Road in Spring Valley. Upon arrival at the address, two officers from the patrol car met with another officer already on the scene, along with paramedics from Hatzolah Medical Center. The officers observed a motionless man on the ground in contact with what appeared to be an energized wire. The officers also observed that a young child and another man were seriously injured. The officers contacted Orange and Rockland to ascertain whether or not the wire was energized, and if energized, to have the Company de-energize the wire. The officers then proceeded to establish their own safety perimeter around the wire, and began interviewing witnesses.

At 11:10 a.m., the Company received a call from its liaison at the Rockland County Fire Control in Pomona, NY advising that two people had been injured by a potentially energized down wire near 138 Union Road³. An operating supervisor arrived shortly after receiving the emergency call and began the process of opening the circuit in order to de-energize the down wire. Manual switching moves on the circuit were performed to isolate and de-energize the wire. At 11:20 a.m., the down wire was de-energized and the paramedics attended to the man lying motionless on the ground. It was determined that he was dead. The young child was severely burned and was taken to a nearby hospital where he died a few days later. The injured man, later determined to be the father of the

³ It was confirmed that the down wire was lying on a sidewalk near 139 Union Road, not 138 Union Road.

young child, was attended to by paramedics and was later interviewed by one of the police officers.

At 11:33 a.m., a crew arrived at the location to cut down the de-energized wire. The Company's post accident field observation concluded that the primary wire was damaged by a tree branch breaking off and falling onto the distribution line.

DISCUSSIONResponse to Initial Down Wire Call

During the period of an active storm, Orange and Rockland does not routinely perform patrol and repair work, nor does it guard down wires, due to safety concerns for its crews. Although utility workers are instructed through training, pre-storm preparations, and morning roll calls to be cognizant of the dangers of dealing with damaged electric facilities, even the most careful worker cannot always be prepared for unexpected hazards under severe storm conditions. Orange and Rockland procedures for work activities during a storm are, in general, consistent with other New York utilities.

In this instance, a qualified technician trained in responding to downed wires was dispatched at approximately 3 a.m. to assess the conditions at the corner of Union Road and Merrick Drive. The technician was given specific instructions to assess the emergency, determine the level of danger, and secure a safe perimeter to alert the general public to the dangerous condition. Upon arrival at the incident location, the technician found a single primary phase line down and burned out on the sidewalk. He determined that the wire was energized. The technician proceeded to cordon off the area by surrounding the energized wire with red warning tape forming a quadrilateral shaped perimeter. The warning tape was wrapped around a pole, a guy wire, part of a fence, and an orange safety cone placed out on the street approximately three feet from the curb.⁴ The technician called his supervisor to provide a verbal report and inform her that the area was cordoned off as instructed. During the technician's initial response, there was no communication between the families of the injured or deceased victims and the technician. Because this response was during the storm, the technician was not instructed to guard the site; instead, he was directed by his

⁴ The Company provided Staff with several photographs that showed red tape and a cone positioned near the down wire.

supervisor to go to another wire down location.

During his interview by Staff, the technician described the actions he took to ensure that the public was made aware of the dangerous conditions. The technician's description of his actions confirms what was stated on record of the incident that the Company provided to Staff and was consistent with the photographs provided. Staff's interview with the supervisor was consistent with the technician's explanations. It was evident from the interview that the technician was knowledgeable as to the Company's site safety procedures. The technician is a qualified field person that has training in identifying energized wires. The technician was also trained to secure a dangerous situation.

Staff believes that the technician acted in accordance with his Supervisor's instructions to cordon off the dangerous down wire. We find that the Company, however, did not take steps to inform residents in the vicinity of the downed line that the situation existed. Orange and Rockland needs to develop procedures and means of enhancing its communications about potential hazardous conditions at such locations, such as placing warning notifications on doors.

Police Reports

The police reports stated that a transformer exploded off a pole; a transformer was on fire; and noted a conversation between an Orange and Rockland representative and a desk officer from the Police Department in which it was related that Orange and Rockland stated that the wire was de-energized. The statement, however, was mischaracterized. A final investigative report filed by the lead detective for this investigation was provided to Staff. The report summarizes the detective's interviews with the witnesses. In this report several witnesses made conflicting statements about the condition of the wire and the accounts of where the victims were and what they were doing prior to the fatal accidents. Staff was unable to determine the exact chronology of how the individuals came into contact with the energized wire.

In response to Staff's interrogatories, the Company stated there was no transformer or other equipment except for a streetlight attached to the pole at the location of the incident. The Company explains that the Orange and Rockland representative did not state to the Police Department desk officer that the power was de-energized on the wire. A recorded conversation, provided to Staff, further confirmed that such statement was not made by the Company representative. The phone conversation on tape revealed that the desk officer asked whether power was out in the area and that the Company representative made reference to power being out in the general area of the incident.

De-energizing the Wire

Company personnel had to manually disconnect parts of the circuit energizing the down wire (the circuit) to isolate the primary wire at the incident location and de-energize the wire. According to the Company, the circuit has remote switching capabilities at the Burns substation, but the control center could not use this feature on August 28, 2011 because of the loss of the Verizon communication lines associated with this circuit⁵. As an alternative to remote switching in this instance, when notified of the emergency, an Operating Supervisor was dispatched to the incident location and performed manual switching moves on the circuit. To de-energize the down wire, the Operating Supervisor opened two Ground Activated Air Breaker (GOAB) switches: the first switch at Ewing and North Main St.; the second switch at Eckerson Road. This method of de-energizing the circuit eliminated power to a number of homes. The approximate time for the switching moves was four minutes. Staff believes that Orange and Rockland took the necessary and proper steps to de-energize the down wire in accordance with Company procedures.

⁵ The Verizon communication lines were required to allow for two way data communication during the automated switching moves.

Responses During Active Storm Conditions

As noted above, the Company's procedures do not call for site safety personnel to respond to wires down during active storms. The Company provided Staff with data for the 24 hour period of August 28, 2011 regarding the number of wire down incidents to which it responded. The data showed that site safety personnel were assigned to respond to and act on several wire down incidents during the storm, even though the Company's procedures do not call for such actions to be taken during a storm. In these instances, including its response to the incident in question, the Company went beyond its usual procedures called for during a storm due to the circumstances present. In fact, Site Safety personnel responded to a number of down wire locations during the storm.

Additionally, during the storm, Control Center Operators were dispatching line crews at various times and for varying conditions, including some conditions that involved down wires. Although Control Center operators and the Site Safety personnel use the same outage management system to retrieve information and assign work, on trouble calls that included down wire incidents, Staff's review found no clear or coordinated interaction between the two organizations. The Company needs to improve its coordination between Site Safety and Control Center Operations, and ensure that both organizations are aware of changes made to the outage management system regarding status updates for these job types. Further, while the Company's storm response procedures do not call for personnel to be responding during a storm event, should the Company determine it's safe to do so, it should develop, in advance, protocols that will be used.

Responses During Normal Storm Restoration

The Company began mobilizing and dispatching its full workforce as required by its procedures between noon and 3 p.m., earlier than originally planned. It uses an outage management system to

coordinate all storm activities including damage assessment information, site safety personnel, and all other workforce assignments for incident prioritization in response to storm emergency calls. Information regarding system deficiencies, including locations of down wires, customer outages, and known damaged facilities is put into the outage management system. The Company's Emergency Response Plan (ERP) states that the outage management system retains all trouble calls that are then compiled into incident jobs, allowing for an efficient way of prioritizing, assigning, tracking, and reporting on each job. Staff found that Orange and Rockland gives and should continue to give high priority to all trouble incidents involving downed wires known to be energized that are located in areas of particular vulnerability to the public. The ERP, however, does not specify how down energized wires are to be prioritized during an active storm, and in what priority repair work related to down energized wires should be performed post storm. This is an area Staff believes that Orange and Rockland needs to change.

Orange and Rockland stated that responding to public safety hazards (such as down wires) and road closures are not considered restoration activities. Therefore, the Company uses a Site Safety group to manage these incidents. Part of the Site Safety task is to submit a Site Safety Field Report that contains information on the state of the down wire. A review of the Site Safety Field Report form suggests that the outage management system should have been able to identify the condition of the wire "as found⁶." Because this information is mainly gathered after the Company responds to the location, this key information regarding the state of down wires during the storm does not always exist. The Company does obtain some information regarding the down line at the time of its report, based on how the call was taken, that allows them to prioritize

⁶ Some examples of "as found" condition could be; wires down on ground, pole to pole, pole to house, hanging low, blocking road; sparking on the road, on the ground, or in trees.

their response. The system used, however, relies on Company personnel to dispatch Site Safety personnel based on known information without any established classifications. The Company indicates that following the initial field report from the technician, this incident was a high priority for guarding when conditions allowed. However, this could not be confirmed by Staff because of the real-time nature of the process.

Given the number of down wires reported during and after the storm, in this instance numbering 3,612, the outage management system must enable the Company to effectively and expeditiously sort and properly track the data it receives during and after the storm such that restoration work can be prioritized. Orange and Rockland did not track the total number of down wires that were actually energized during and after the storm, and therefore could not with any degree of certainty provide Staff with those numbers. Even though the information is in its outage management system, the Company asserts that it is not readily available. It is Staff's view that the Operators and Site Safety Supervisors should have the capability to easily extract and distinguish data involving confirmed down energized wires. Staff concludes that the Company's capability to track and readily identify energized down wires for repair on the outage management system needs to be strengthened. Staff further believes that work related to emergencies during an active storm may in certain cases require higher prioritization than post storm restoration work. Therefore, Orange and Rockland should specify in its ERP how down energized wires are to be prioritized during an active storm, and in what priority repair work related to down energized wires should be performed post storm, taking into account the level of potential for public harm (including for example, the population density of the area, the level of pedestrian access and use of the area, and the proximity to facilities such as schools) and the safety of utility employees.

CONCLUSION/RECOMMENDATIONS

Based on the analysis of the interrogatory responses and interviews with Company representatives, Staff believes the Company's response to this incident was consistent with Company procedures, its past practice, and, in general, similar to practices used by other utilities. Staff concludes that this was a tragic accident that occurred under hazardous conditions. Staff, however, has identified areas for improvement and recommends that the Company should strengthen its procedures for dealing with hazardous down wires in the future. Specifically, in accordance with the discussion herein, Staff recommends that Orange and Rockland:

- improve coordination between Site Safety and Control Center Operations, and ensure that both organizations are aware of changes made to the outage management system regarding status updates for these job types.
- develop procedures and means of enhancing its communications, such as placing warning notification on doors, to inform customers a down wire is located in their vicinity.
- specify in its Emergency Response Plan how down energized wires are to be classified during an active storm, and in what priority repair work related to down energized wires should be performed post storm, taking into account the level of potential for public harm (including for example, the population density of the area, the level of pedestrian access and use of the area, and the proximity to facilities such as schools) and the safety of utility employees;
- specify in its Emergency Response Plan what actions all Company personnel should take, during an active storm, when they respond to a location that has down wires;
- strengthen its tracking capability and its ability to readily identify known energized down wires in the outage management system; and

- incorporate the above recommendations into its Emergency Response Plan as soon as possible.

This report and the above recommendations should be reviewed by all New York utilities. The recommendations should be implemented to the extent they are not already in place.